# Chemical Week-





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Do you know how little extra it costs to get the highest grade of caustic potash—Solvay Mercury Cell Caustic Potash?

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CHEMICAL MATERIALS FOR INDUSTRY

Chemical Week • March 24, 1956

# Chemical

# Week

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March 24, 1956

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## Chemical,

March 24, 1956

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Germfree mankey in a germfree cage gets a germfree lunch from a germfree hand at Lobund Institute, University of Notre Dame. Sterile conditions from birth permit the study of the effects of single germ types. Becco Peracetic Acid has been found useful in rome physics of this coemfree presental.



Now rubber grows in a factory! The development of GR.S synthetic rubber kept our nation on wheels during the last war when natural rubber supplies were cut off. Becco supplies Potassium Persulfate, an essential catalyst in GR.S production, to the synthetic rubber industry.



Over 11/2 miles of screen printing tables are installed at Ahern Textile Print, Inc., Narwich, Conn The fine fabrics used are bleached with Becco Hy dragen Peroxide: printed fabrics color-fixed with Becco Hydrogen Peroxide or Sadium Perbarate.



Most people think hydrogen peroxide is used principally as a hair-bleach. Actually, only a smal portion of the production of Becco Hydrogen Peroxide is used in cosmetics.

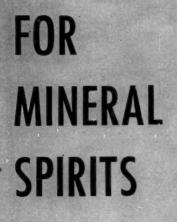
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### OPINION...

### Ready by July

GENTLEMEN: In an article you published, "You'll Be Seeing Them in a New Red" (Feb. 25), there is reference to us . . . [giving] the impression . . . that Kentucky Color was not making any headway in the development of these Mercadium Reds.

... You made the statement, "Kentucky Color & Chemical (Louisville) says it's been doing intensive research since last October, hasn't come up with anything yet." . . .

We have gone far enough through semiplant production to apply for patents and have placed an order for machinery and expect to be in production by July 1.

SEVIER BONNIE
President
Kentucky Color & Chemical Co.
Louisville, Ky.

### Peroxide-Powered Rockets

DEAR MR. JOHNSON: . . . The peroxide article (March 3) proved to be very interesting and informative; and I am pleased to enclose a summary report of the development program of peroxide-powered rocket engines mounted on helicopter rotor blade tips, mentioned in the article. . . .

M. E. AYERS Reaction Motors, Inc. Denville, N.J.

### Reasons for Re-evaluation

DEAR SIR: It seems to me that we would be remiss if we and the sponsors of the other types of flexible foam referred to in "Future Foam-Up"... (March 10) failed to express admiration and appreciation for the forecasts and appraisals that you made of this burgeoning new industry.

Compressed in this story was much helpful information. For the generality of readers who know little about the dramatic progress that has been made

CW welcomes expressions of opinions from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y. in this field and the expanding production facilities, you have presented reasons for some re-evaluation.

HENRY E. ALLEN Vice-President Elastomer Chemical Corp. Newark, N.J.

### **Opposing Report**

DEAR SIR: Seeing that Kenneth R. Brown, writing in your "Opinion" columns (March 17), told readers how they could get copies of a legal brief opposing fluoridation, I thought I'd tell you about a legal brief supporting fluoridation.

It's a report issued by the New York office of the U.S. Dept. of Health, Education & Welfare summarizing the 18 cases since 1952 in which plaintiffs in 13 states and Canada attempted through court action to halt fluoridation programs. In every case the courts upheld fluoridation.

Pennsylvania's Secretary of Health B. F. Mattison has cited the report as "proof that this public health measure is both legal and desirable." And he goes on to say that "anyone who studies these cases will see that when individuals who oppose fluoridation can be confronted with the evidence and questioned suitably, as is possible in court, not one of their arguments can be upheld."

S. M. ROSEN Brooklyn, N.Y.

Reader Rosen apparently saw this report as soon as we did and wrote us about it immediately. We have a note about it on p. 36 of this issue.

—ED.

### Time Running Out?

GENTLEMEN: Congratulations are due you for your excellent report (March 10) on the Russian chemical industry. It is particularly timely right now, I think, with talk of tax cuts for obvious political reasons, to reflect on the potential industrial strength of the Communist world. . . The time is fast running out during which we can claim industrial superiority over a potential enemy . . Despite some easing of international tensions, this is no time to be complacent and take down our guard. . . .

August Schoepfer Milwaukee, Wis. "A plasticizer for every purpose"

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KRONITEX (tricresyl phosphate) plasticizer is widely used in vinyl floor tile applications because it improves many important properties; properties desired by the ultimate user as well as by the manufacturer in processing.

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RESISTANCE TO CIGARETTE BURNS is an important factor to consider, particularly if the installation is in offices or public buildings. Kronitex has long been considered the top plasticizer for flame retardance and again proves to be superior to other plasticizers for resistance to cigarette burns. Floor tile made with Kronitex has excellent resistance to staining from crushing or mashing lighted cigarettes and matches on the surface of the flooring.

LOWER PRODUCTION COSTS are possible because compounds containing Kronitex are rapid fluxing. In laboratory fluxing tests when a compound of polyvinyl chloride resin and 63 parts per hundred resin of Kronitex were run @ 310°F. the fluxing time was only about half that of a compound containing dioctyl phthalate. The fluxing time of any slow fluxing compound can be reduced by including Kronitex in the formulation.

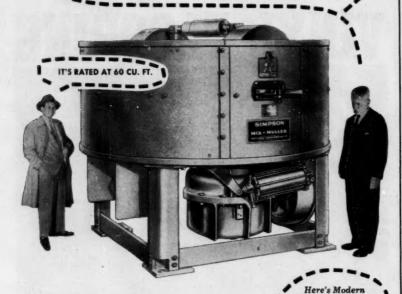
An evaluation of one of the four types of KRONITEX manufactured by Ohio-Apex may bring about a solution to many of your present floor tile problems.

Complete technical data sheets on the FOUR TYPES are available and will be

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THIS IS THE 3F SIMPSON MIX-MULLER — with it, you can prepare 40 to 60 cu. ft. of intimately blended materials . . . in minutes. How many minutes depends upon what you're mixing, naturally. But, we have users who once counted materials preparation time in days . . who now talk in minutes, thanks to their Simpson Mix-Muller.

Mixing is our business at National; it has been since 1912. In recent years, increased mixing capacity for today's production requirements has been a big part of that business. That's why the Simpson Mix-Muller utilizes a stationary pan, automatic bottom discharge and is equipped with spring loaded mullers . . . to make the most of every minute of mixing cycle duration.

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NATIONAL ENGINEERING CO. (Not Inc.) 642 Machinery Hall Building Chicago 6, Illinois OPINION .

### Started in 1946

DEAR SIR: We have read with interest . . . [about] enamels and lacquers competing lustily for \$80-million/year auto paint business . . . (March 10).

We would like to point out that our company has been working with these newer-type alkyd finishes for many years. To gain manufacturing and production experience we began in 1946 in a limited way on certain automotive small parts and interior parts where exposure requirements were relatively not too important. With the satisfactory completion of exposure data and the development of formulating technique, we went into exterior automotive finish production in March, 1955, at one of the major automobile manufacturers.

This series of enamels was designated Cook's 700 Line, and with the advent of 1956 models we started supplying numerous colors to several manufacturers. Our success has been most gratifying.

In addition to our direct sale of colors to the automotive manufacturers, we have also sold considerable quantities of our resin to other paint manufacturers for use in their automobile finishes.

JOHN S. AYRES
Assistant Vice-President
and Research Manager
Cook Paint and Varnish Co.
Detroit

### **Unfair Competition?**

GENTLEMEN: I was struck by the implications of your recent report on self-insurance, "How to Pay for Disaster" (March 10). In it you say, "Usually, the larger the company, the easier it is to set aside the required funds." Insurance firms are in business to make money, and therefore the premiums they charge add up to more than their reimbursements for insured losses

Assume that a large company can afford to set up a self-insurance reserve, and its losses over the long term are average; doesn't it have an unfair competitive advantage over the small firm that must take out insurance? Perhaps my point of view is more socialistic than the U. S. businessman's.

P. G. ROBICHAUD Montreal, Que. Canada

17 no. 11"

### SEE YOU THERE

Society of Plastics Industry, 13th anaual Pacific Coast Section Conference, St. Francis Hotel, San Francisco, March 27-April 2.

Society of Cosmetic Chemists, dinner meeting, 6:30 p.m., Brass Rail Restaurant, 521 Fifth Ave., New York, March 28.

Material Handling Institute Inc., spring meeting, Edgewater Beach Hotel, Chicago, April 3.

Scientific Apparatus Makers Assu., 38th annual meeting, Belleview-Biltmore, Belleair, Fla., April 8-12.

American Chemical Society, 129th national meeting, Dallas, April 8-13.

American Pharmaceutical Mfg. Assn., annual meeting, Boca Raton Club, Boca Raton, Fla., April 9-11.

Midwest Research Institute, symposium for management on applications of analog computers, Hotel Phillips, Kansas City, Mo., April 10-11.

Metal Powder Assn., 12th annual meeting, Hotel Cleveland, Cleveland, April 10-12.

Council for Agricultural & Chemurgic Research, annual conference, Congress Hotel, Chicago, April 10-12.

American Society of Biological Chemists, spring meeting, Atlantic City, April 16-20.

American Institute of Chemical Engineers and University of Pennsylvania, 4th annual meeting on "Experience in Industry," Museum Auditorium, Philadelphia, April 17.

National Industrial Research Conference, theme: "Research for Profit," Sherman Hotel, Chicago, April 18-19.

American Zinc Institute, 38th annual meeting, Hotel Statler, St. Louis, April 23-24.

American Oil Chemists' Society, Sham-rock Hotel, Houston, April 23-25.

Assn. of Consulting Chemists & Chemical Engineers Inc., symposium and banquet, 5:00 p.m., Hotel Belmont Plaza, New York, April 25.

National Sanitary Supply Assn., 33rd annual trade show, Conrad Hilton Hotel, Chicago, April 29-May 2.

Chamber of Commerce of the U.S., 44th annual meeting, Washington, D.C., April 30-May 2.

American Institute of Mining & Metallurgical Engineers, mining and metals branch, regional conference, Olympic Hotel, Seattle, May 3-5.

American Institute of Chemical Engineers, meeting, Roosevelt Hotel, New Orleans, May 6-9.

American Water Works Assn., Diamond Jubilee Conference, St. Louis, May 6-11.

# HORTONSPHERE

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Designed for working pressures up to 75 lbs. per sq. in., the 15,000-bbl. Hortonsphere® above is used to store anhydrous ammonia at the Curry Chemical Company, Funk, Nebraska. This CB&I welded steel structure is designed to withstand internal pressure and will not allow contents to escape as long as the setting of the pressure relief valves are not exceeded. This Hortonsphere is also insulated and refrigerated to further guard against the loss of the stored anhydrous ammonia.

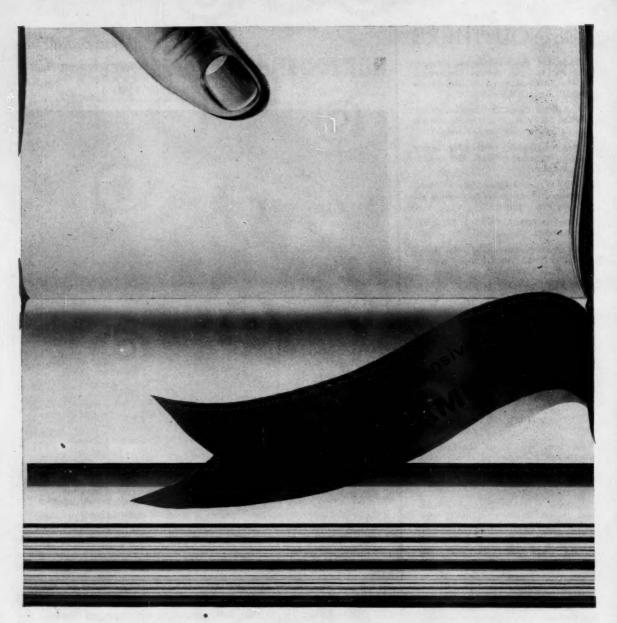
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... 54 pages on -

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- Bibliography

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### **Business**

### Newsletter

CHEMICAL WEEK March 24, 1956 More chemical operations are ahead for Witco Chemical. They'll be financed by the proceeds of a sale of 25 oil and natural gas wells that had been owned and operated by a subsidiary, Witco Oil and Gas Co.

The company has many interests parallel to these oil and gas operations—notably in carbon blacks. It not only produces blacks, but it also distributes them for such affiliates as Continental Carbon and Continental Blacks (in which Continental Oil has an interest). Witco, too, has diversified its organic chemical interests—owning a half interest in Ultra Chemical Works (Paterson, N. J.), and having purchased the chemical division of Chicago's Emulsol Corp.

The "Chemical" in Food Machinery and Chemical Corp. is becoming more important. The company's sales of agricultural and industrial chemicals last year hit 48% of total sales—up from 44% in '54.

And both sales and profits were at record levels—\$265 million and \$14.8 million, up 13% and 23%, respectively.

### Other earnings:

Colgate-Palmolive had total sales of \$469 million in '55, \$286 million worth in the U.S. Net was \$14 million.

Nopco Chemical's earnings of \$3.05/share were up 15% from '54, with sales up 12%.

Du Pont of Canada enjoyed an 18% increase in sales, to \$65.5 million, due partly to higher Canadian sales, and also to export sales of nylon to Europe. Net income for '55: \$6.4 million, 51% above the previous year.

Dominion Tar and Chemical reports a \$3.8-million profit, more than double 1954's \$1.88 million.

Allied Chemical wants to increase the common stock shares it can issue. It will ask stockholders next month to increase the authorized but unissued common stock of the company by 2 million shares. This would bring total authorized shares to 12 million.

Why the increase? For possible future use. Allied reports it has no present plans for use of the shares.

Harshaw Chemical's common stock, meanwhile, has been accepted for trading on the "big board." Sales on the New York Stock Exchange are slated to begin on March 28.

The 10 stockholders of Montrose Chemical will sell part of their common stock holdings; 594,320 shares (of 950,000 outstanding) will be up for public sale.

No revision of Pennsylvania's food and drug laws is ahead. The state's House of Representatives voted down a bill that would have provided the first revision in 47 years. Major opponents said that more time was needed to study the proposal, which, among other things, would have provided for establishment of tolerances for "deleterious" chemical additives.

The same legislators, however, unanimously passed a bill that would require registration of every grade and brand of fertilizer sold in Pennsylvania.

# **Business**Newsletter

(Continued)

The White House has ordered a review of the current Administration policy on alien property return, which calls for return of up to \$10,000 in cash or property to individual claimants. No return would be made of seized property owned by a corporation. There's little chance Congress will approve automatic return of much more than \$10,000 per claim.

General Aniline & Film will go ahead on ethylene oxide. And, for a company that's just getting into the business, it has big ideas. It has signed a contract with Scientific Design for a 60-million-lbs./year unit, to be erected at Grasselli, N.J. Completion date: Sept. '57.

Some 10-20 million lbs. of the output will go for use in its own nonionic detergents. The rest will be sold as ethylene glycol, in antifreeze, industrial and fiber grades.

One feature: it will sell part of its glycol to Esso, which will supply ethylene to GAF as raw material for the oxide (CW Business Newsletter, March 10).

### Other expansions in the news-

West End Chemical will install a new salt cake unit at its Searles Lake, Calif., plant, which will slightly more than double its current 150-ton/day capacity for 99.8% pure material. Expected completion date: end of '56. The company, which may be merging with Stauffer Chemical (CW Business Newsletter, March 17), sells most of its production to kraft pulpers.

Columbian Carbon will install a 20-million lb./year carbon black unit at North Bend, La., and is considering erecting an identical second unit. The move, reports Columbian, is advisable in spite of below-capacity operations at many of the industry's carbon black plants, because rubber fabricators are demanding an increasing variety of different grades of black.

Pittsburgh Coke & Chemical has broken ground for a new \$3-million phthalic anhydride unit, to be built at its Neville Island works. The plant, which will double PC&C's phthalic production, is slated to start up late this fall.

And a switch in expansion plan was made definite last week. Alcoa, just after announcing plans for a 150,000-tons/year aluminum reduction facility to be built in the Ohio Valley (p. 20), acknowledged that its plans of several years ago for a \$400-million smelter near Skagway, Alaska, have been scrapped.

Alcoa had planned to produce 200,000 tons/year there, using water power from Canada's upper Yukon River for power. Canada, however, turned down request for use of her water—a decision Alcoa officials did not consider final. But since that time, economics have changed. Freight rates for aluminum ingots are up, and technology of coal utilization is more advanced.

So Alcoa will construct a plant somewhat similar to Olin Mathieson's plant (CW Business Newsletter, Jan. 28), using underlying fuel supplies.

What say! A chemical humor anthology? An Allied Chemical market researcher hopes to produce such a book. Any contributions—anecdotes about chemical personalities, cartoons, humorous stories, etc.—will be gratefully accepted by Phil Pafford, 40 Rector St., New York 6, N.Y.

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● The seal of the United States when stamped on a silver dollar assures the holder that the coin is legal tender. As such, it is accepted throughout the world in payment for goods and services.

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### **MUTUAL CHEMICAL DIVISION**

- ALLIED CHEMICAL & DYE CORPORATION-

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# MIGHTY ... SAFE!

# Navy adopts Cellulube\* fire resistant hydraulic fluids to safeguard aircraft elevator systems

To minimize danger from fires and explosions that might hamper the operational efficiency of its great carriers, the U. S. Navy is now using Celanese\* Cellulube 220, a straight chemical compound, as hydraulic fluid to activate deck-edge elevators.

Used for more than 1,500 hours aboard the Bennington, Shangri-La and Ticonderoga, Cellulube 220 is in service aboard the new Saratoga, and is also being evaluated for additional Naval applications.

Cellulube 220 is one of a series of synthetic (nonpetroleum) functional fluids developed for industry by Celanese in six controlled viscosities. These fire-resistant hydraulic fluids and cylinder lubricants provide a significant margin of safety wherever high temperatures and pressures may cause fire or explosion.

For additional information about the Celanese Cellulube series, write to Celanese Corporation of America, Chemical Division, Department 752-C. 180 Madison Avenue, New York 16.

In Canada, Canadian Chemical Company, Ltd., Montreal, Toronto, Vancouver.

DECK EDGE ELEVATOR TAKES PLANE TOPSIDE. Cellulube 220 is being used in elevators of this type on the Shangri-La, Bennington and Ticonderoga. The Navy plans to install fire-resistant hydraulic fluids



OFFICIAL U.S. NAVY PHOTOGRAPH



Basic reasons .....

Acids Alcohols Aldehydes Anhydrides Functional Fluids Polyols
Gasoline Additives Plastici
Glycols Salts
Ketones Solvent

Polyols Plasticizers Salts Solvents Vinyl Monomers Celanese

..... for improved products

Agricultural, automotive, aviation, building, electrical, paper, pharmaceutical, plastics, surface coatings, textile.

# Chemical Week

F'rom its prewar unity		West zone plants to many segments War II	But now the are getting	
	1. Bayer	4. Casella	1. Bayer	)
I. G. Farbenindustrie	2. Hoechst	5. Huels	2. Hoechst	Casella
		J. Hueis	3. Badische	
	3. Badische	6. Others*	4. Huels	

### From Ashes to Trust?

This week, the ghost of I. G. Farbenindustrie has risen from its ashes and is walking again.

Recent actions of the three large successor companies to the West German segment of IGF have again raised the specter of a single, unified German chemical colossus.

The three—Farbenfabriken Bayer, Badische Anilin and Farbwerke Hoechst—have jointly acquired control of one of the two other Farben successors, in West Germany, Leopold Casella Co. The three have purchased Casella shares quietly during the past few months—on pretty much an equal basis—through banks and stock exchange firms. Bayer and Badische now each owns better than 25%, while Hoechst reportedly owns slightly less than a fourth.

Worries caused by this purchase are accentuated by the remarkable recovery of the German industry. Only 40% of the plants of the Farben trust—which, before the war, sold about \$1 billion worth of chemicals per year—were in the West German zones. Sales of the companies that took over these plants totaled about \$800 million last year.

But American observers, who note that in many Latin American countries all three of the German firms use a single sales agent, say that such sales combination does not come anywhere close to what it had been there before the war.

There are no accurate figures on production of sales of such Russian-controlled-plants as the Wolfen, Leuna and Bitterfeld works. Assuming that their sales were equivalent to \$600 million—undoubtedly a conservative figure—you begin to see the magnitude of what was once the Farben empire. And, of course, any future unification between East and West Germany might make possible a full amalgamation.

On the Other Hand; But the success of the postwar West German enterprises has perhaps been an eye-opener for many industrialists, who now argue against integration.

"The bigger the organization, the more rigid its methods," asserted one Hoechst director. "The problem in Germany is to keep the great chemical enterprises as elastic as possible."

Echoed another: "Three sell better than one."

"I doubt if they will get back together," said one Washingtonian. "From a bureaucratic standpoint alone, few managers would consciously vote their jobs out of existence.

\*Originally, West zone remnants of the Farben trust were split into 32 companies; later, this number was reduced to a dozen. Generally, companies from this list—such as Agfa and Kalle—merged into Bayer, Hoechst and Badische, bringing the number of Farben successors down to five, and now to four.

Each of the three has a strong management, with a vested interest in independence."

And Legally . . . : The whole question of German cartels is now in a legal limbo. Now under consideration by the German Parliament is a bill that recognizes that an undue concentration of industry is, in itself, something to be avoided.

This approach, rather than one that would merely control abuses of concentrated business power, seems more likely to become law eventually.

This approach, supported by Economic Minister Ludwig Erhard, may be weakened, however, to allow mergers "in the national interest," in emergencies, and for technical reasons. But American observers in Germany feel heartened that at least the principle is recognized.

A second provision of the law would give an anticartel committee power to dissolve business amalgamations if they result in dominant positions in an industry.

Chemical Divestment? Could ownership of Casella by the Big Three be taken away under such a law?

Probably not. It apparently would affect only mergers or acquisitions that take place after—and if—the bill is approved, and signed into law.

Too, there's some question on whether such a law would affect any overseas combinations by German concerns.

### 1956 CHEMICAL EXPANSION PLANS

(million dollars)

				/******	on a	onars,								
					955 Quarters			1956 Quarters			1956	Change		
	1953	1954	lst	2nd	3rd	4th	Total	lst	2nd	3rd/4th	Total	iro	m '55	
Chemicals, allied products	1,428	1,130	231	230	239	317	1,016	310	340	388	1,426	up	40.4%	
Petroleum products	2,668	2,684	490	730	741	836	2,798	724	865	867	3,322	up	18.7%	
Glass, allied products	346	361	88	106	121	183	498	159	196	165	685	up	37.6%	
Paper, allied products	409	455	92	120	142	164	518	169	182	181	712	up	37.5%	
All manufacturing	11,908	11,038	2,249	2,795	2,899	3,499	11,439	3,340	3,808	3,944	15,036	up	31.4%	
All industry	28,322	26,827	5,847	7,009	7,449	8,398	28,701	8,056	9,000	8,919	34,893	up	21.6%	

## Two Indications of Optimism

Chemical company executives this week had two handfuls of good news to ponder—surveys showing that their fellow manufacturers plan substantial step-ups in spending for new plants and equipment, and that consumers, who are more and more becoming both direct and indirect customers of the chemical industry (CW, March 10, p. 52), feel that '56 is still a good year to buy merchandise.

From either point of view, the economic outlook in the coming months speaks encouragement to the chemical industry.

Take expansion plans first:

On an all-industry basis, this year's investment in new plants and equipment by companies is expected to reach a new peak. Some \$6.2 billion over the 1955 mark is estimated for capital expenditures in '56.

Chemical and allied products industry increase in capital spending will top that of any other nondurable goods industry. Last year's new-plant outlay of \$1 billion will be overshadowed by an estimated \$1.4 billion for new plants and equipment this year (see chart).

What's more, this new high will be further swelled up by a whopping \$3.3 billion to be spent by petroleum companies, \$685 million by glass producers, and \$712 million by paper companies.

Contributing in part to the 40% boost for the chemical industry will be the plans of such firms as these:

- Union Carbide—spending over \$102.5 million for new 1956 facilities.
- Allied Chemical & Dye—laying out some \$70-80 million this year, compared with more than \$54 million

last vear

- Koppers—tagging some \$100 million over the next four years for new plant (some two-thirds of it to be invested in 1956-57 expansions).
- Dow Chemical—investing a near-\$49 million for current year's capital expansions.
- Stauffer Chemical—slating some \$15 million for new plants and capital improvements during the year.

Petroleum industry capital spending will contribute its share in bolstering the capital goods boom. For example:

- The Texas Co. expects to dole out \$325 million this year (compared with \$283.1 million last year).
- Atlantic Refining plans \$20 million more in '56 capital expenditures than in '55.
- Esso Standard has earmarked a total of \$126 million for capital investments this year, highest in the company's history. Of this, about \$16 million will go for chemical projects. But closely related to this is another investment item—\$35.5 million—for new or improved equipment for gaso-

line, heating oil and other fuel production at the company's six big refineries.

Aside from these new capital spending plans for 1956—which show how chemical companies are betting on continuing prosperity—still another bolster was tossed in for good measure this week: the note of confidence reflected by consumer buying intentions, which were surveyed for the Federal Reserve Board by The Survey Research Center of the University of Michigan.

Nothing in the survey signals a decline in automobile or home purchases. In fact, the biggest surprise in the survey is that the number of consumers who actually plan house purchases this year is slightly higher than the figure of those with similar intentions this time last year. Other planned expenditures are roughly the same as last year.

All-in-all, the two surveys add up to cheerful news for chemical companies. If anything, the results support their going policy of building new plants to meet the needs of a growing economy.

# Challenger's Round

There was new evidence this week that Du Pont's claim of being dominant factor in isocyanate sales will not long be uncontested.

For Mobay Chemical, which seemed about to take a second seat in relation to Du Pont (CW, Feb. 25, p. 23), now plans to be very much back in the running when it comes to having largest U.S. production of the

toluene diisocyanates, which are the key to volume polyurethanes.

While Du Pont a month ago brought on line a plant it rates at a 25-million-lbs./year capacity, Mobay will triple the reported 10-million-lbs./year capacity of the isocyanate facility it started up a week earlier. Du Pont's plant is at Deepwater, N.J.; Mobay's, at New Martinsville, W.Va.

The decision to expand this plant was made Feb. 28 at a meeting of the board of directors of the Monsanto-Farbenfabriken Bayer subsidiary. While it was based on market studies that had taken six months to complete, some trade observers feel that the decision might have been influenced by knowledge of the size of Du Pont's plant—first revealed when it came onstream.

Mobay expects to complete engineering (already half done) and construction by about June, '57.

"It's hard," a company official remarks, "to build anything these days in less time than that." Mobay does point out that availability of some critical construction items, often difficult to predict, could upset the best-planned schedules.

Concurrent with the tripling of its isocyanate capacity, it will increase capacity for producing the linear polyesters used in urethanes.

Mobay's unit for these materials, which came onstream in November, was somewhat larger than required for the then-building isocyanate facility. This time, Mobay plans a closer match.

### Groups Turndown

Two chemical industry men this week opposed the proposed Organization for Trade Cooperation designed to administer the General Agreement on Tariffs and Trade (GATT), which embodies free world trading rules and has been the framework for tariff negotiations since the war.

Allied Chemical's Richard Hansen, speaking for the Manufacturing Chemists' Assn., asked the House Ways and Means Committee to shelve OTC so that a special joint Congressional committee could re-examine the basis of U.S. participation in GATT.

Cyanamid's Sidney Moody, representing the Synthetic Organic Chemical Manufacturers' Assn., warned the committee that strengthening GATT through OTC would threaten serious injury to the U.S. organic chemical industry.

Hearings on the measure in the House were concluded last week. A vote on it is expected early in April. Observers on Capitol Hill give OTC a good chance of passing the House but almost no chance of getting through the Senate.

# **Right Compromise?**

Sponsors of a new, tougher federal water pollution control program this week were cheerfully tallying up the score on public sentiment for and against the latest compromise bill to which they've hitched their hopes for victory this year.

Four days of fully packed Congressional hearings last week produced overwhelming support for a new law, both broader and stronger than the present act, which expires this June.

Last week's hearings saw over 60 witnesses—from federal, state and local pollution control agencies, conservation and recreation groups, and manufacturing industries — take a stand on pending bills before the House Public Works subcommittee on rivers and harbors.

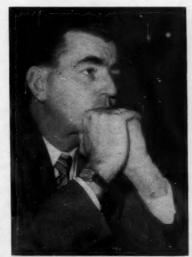
They drew this picture: chief value of the present federal program has been to focus interest on the pollution problem, help states to formulate abatement programs. It's been weak, almost ineffectual, in compelling abatement measures for interstate streams. Not once in eight years has the Surgeon General taken anyone to court to force cleanup action.

The Result: Spotty progress—a stepup in voluntary waste treatment by industrial water users, but not enough to check the steady rise in waste volume, caused partly by burgeoning factory construction. Virtually alone, among this week's witnesses, in seeking extension of the present narrow law were two industry groups—the National Assn. of Manufacturers and the American Pulp and Paper Assn. The Manufacturing Chemists' Assn., speaking through Du Pont's Harold Jacobs, also favored retention, but admitted it could live with a tighter law, provided stringent safeguards were included against premature federal enforcement.

Jacobs joined NAM and the pulp and paper group's J. M. Holderby and Robert O'Conner in protesting the proposed deletion of the current act's requirement that federal courts weigh "the physical and economic feasibility" of proposed abatement measures before ordering industry to undertake them.

Chairman John Blatnik (D., Minn.) and subcommittee colleagues seemed less impressed with industry's inability-to-pay fears than the counterarguments of state officials that this limitation would tie a court's hands in advance. State judges, said Michigan's Assistant Attorney General Nicholas Olds, have more leeway than federal judges in deciding on remedies sought by state authorities. Michigan industries, he testified, have learned to live with this, have not fled the state when faced with abatement orders.

Subcommittee members and some





APPA'S O'CONNOR, HOLDERBY: Courts should check abatement feasibility.



DU PONT'S JACOBS: Wanted—safeguards against premature enforcement,

state health officials used the hearings to blast industrial polluters. Paper and pulp mills, despite their \$7.5million/year spending on abatement measures, took the brunt of the attack. But chemical producers, who invest \$25-40 million/year to treat their wastes, drew praise from an unexpected source. The Administration's top witness, Assistant Secretary of Health, Education & Welfare Rosell Perkins, told congressmen that "chemical companies have shown an increased awareness of the pollution problem their operations are causing. They are giving us good cooperation. This is not general throughout industry."

### ...And, Back in Georgia...

The rains came, but pollution problems remain for Rayonier's Jesup, Ga., cellulose plant (CW, Feb. 25, p. 24). At the moment, the "slimy substance" clogging the shad nets downstream has abated somewhat with the high water level. But complaints are still strong from fishermen who claim Rayonier's effluent is ruining edibility and saleability of fish.

Yet, despite an unfavorable report turned in last week by the state committee investigating the complaint, Rayonier is doing well public-relationswise. In fact, State Attorney General Eugene Cook has officially commended Rayonier personnel for their full cooperation all along the line.

Weighing heavily on Rayonier's shoulders right now, however, is this part of the investigating committee's report: "There is overwhelming evidence indicating that a large percentage of fish taken from below the Rayonier plant do have an offensive odor.

"Because of the offensive taste and formation of a gummy substance from the effluent, the commercial fishermen are suffering a great loss in that the fish are noncommercial and the nets used rendered unusable."

Meanwhile, fishermen in the area have been likening the fish flavors to kerosene, coal oil, pine oil, and rosin gum. But Fred Doherty, the plant manager, reports, "It is difficult for us to reconcile such suggestions with the small amounts of kerosene we discharge into the river."

Even so, Rayonier hopes soon to eliminate kerosene in the mill effluent. Whatever the answers to the off-taste, odors and slimy nets may be, the Georgia officials' full-scale probe will continue just as soon as the Altamaha River recedes to near-normal levels.

### EXPANSION. .

Aluminum: Alcoa will probably begin work later this year on its proposed 150,000-tons/year smelting plant in the coal-rich Ohio River Valley. It will borrow as much as \$150 million in 1957 to finance the project. With the new facility, Alcoa's primary aluminum capacity will jump from 777,000 tons to 927,000 tons/year.

Crude Tar: Dominion Tar & Chemical (Montreal) will erect a \$2-million crude tar distillation plant on five acres at Hamilton, Ont., if the Hamilton city council grants its approval.

Caustic: Stauffer Chemical is expanding its Niagara Falls plant at a cost of \$1 million. About \$400,000 of this will go for added caustic soda (73%) production. Another \$150,000 will be spent to increase chlorinated solvents output by about 10-15 tons/day. Both additions will be in by late summer.

Molybdic Oxide: By installing a second sublimation furnace at its Langeloth, Pa., plant, Climax Molybdenum will double its pure molybdic oxide capacity to 5.4 million lbs./year.

September is the expected completion date.

Cement: Three companies make news this week. As the initial step in a British-financed \$100-million expansion program in British Columbia, Canada, an \$8-million cement plant will be built near Chilliwack by International Cement. Production will start at \$00,000 bbls./year.

• Verde Valley Industries, at Clarkdale, Ariz., will bring a 2,500-bbls./ day cement plant into production by Jan. '57. Estimated cost: \$8.5 million. Kent B. Diehl, Sr. (Houston) has the engineering and construction contract.

• Lone Star Cement has purchased 250 acres of limestone reserves near Demopolis, Ala., to supply its plant there, which is being expanded at a cost of \$1.5 million.

Manganese: Strategic Materials (Buffalo) will build a \$1-million plant near Niagara Falls, Ont., where the firm's new Strategic-Udy Processes subsidiary will convert low-grade manganese ores into ferromanganese for steel production.

Benzene: Cosden Petroleum will expand production of nitration-grade benzene, toluene and xylene 30% by July of this year. Cost of the additional capacity: \$2.5 million.

### COMPANIES.

North Central Chemicals has been incorporated in Cambridge, Wis., with an authorized capital stock of 1,200 shares of no-par common stock.

Beryllium Corp. (Reading, Pa.) expects to diversify its chemical operations by building additional plant facilities.

H. I. Thompson Fiber Glass Co. (Los Angeles), producer of high-temperature insulations and industrial plastics, has offered for public sale 16,000 shares of its par \$1 capital stock now owned by company executives and their families. Reason: to improve marketability of its stock.

Warren Petroleum, which was recently merged into Gulf Oil Corp., has exercised its option to purchase a 300-acre industrial site on the San Jacinto River and Wallisville Rd.

### Washington Angles >>>

>>> President Eisenhower's signature on a law passed last week will offer the Louisville butadiene plant for sale or long-term lease to all comers. But Publicker Industries expects to be the sole bidder. No other company, it told Congress, has enough low-cost alcohol to run the plant.

Publicker has already lined up three customers for the 30,000 tons/year of alcohol-derived butadiene it's producing at the Louisville plant, expects to find others (chiefly Goodrich-Gulf's Institute, W. Va., rubber plant) to bring output to the 90,000-ton/year capacity level and then expand to 115,000

Publicker is selling butadiene at 15 to 17.5¢/lb. to Firestone (by swapping butadiene with Esso), American Synthetic Rubber and Canada's Polymer Corp. It also converts alcohol produced by Shell Chemical for sale by Shell to an Akron GR-S producer.

>>> Isocyanates will join neoprene and reinforced polyesters in a novel plastic end use.

Rigid urethane foam with high energy absorp-

tion properties is used as the liner in a new laminated Fiberglas protective helmet now being issued as standard gear to naval aviators. Features of the new helmet include soft-foam neoprene sizing to fit the helmet to various head sizes.

>>> "Promising"—that's how five new antibiotics are rated by Agriculture Dept. scientists as weapons against plant fungus diseases. Four—anisomycin, mycostatin, filipin and oligomycin—are made from streptomyces moulds; the fifth—griseofulvin—from penicillium.

Oligomycin, a University of Wisconsin development, showed the greatest effectiveness.

>>> Domestic fluorspar producers, with half their mines and mills shut down, forecast that another 20% will drop out this year if Eisenhower turns down their bid for tariff relief. "Imports of fluorspar," a producers' representative told Congress last week, "are entering the U.S. at a reduced rate of duty in an amount far in excess of the total domestic consumption."

Eisenhower, faced with a 3-3 Tariff Commission split on a recommendation for higher duties on acid-grade fluorspar, is expected to keep tariffs at the present level.

(Houston). No immediate plans for developing the industrial site are revealed.

General Electric will move its plastics department headquarters from Pittsfield, Mass., to Decatur, Ill., on April 1.

New Jersey Zinc Co. on May 1 will acquire American Cyanamid's Gloucester City, N.J., plant, where it will produce titanium dioxide pigments.

Texas-Adams Oil has acquired U.S. Sulphur Co., which has ore deposits estimated at \$6 million near Dolores, Colo.

### FOREIGN. .

Titanium/Ceylon: Alfred Krupp, Germany's wartime armaments king, has offered to exploit Ceylonese ilmenite deposits near Colombo. Krupp would provide the machinery to work the deposits and would also invest in the project. Should the offer be accepted, arrangements would be made for the export of ilmenite to Germany.

Two Ceylonese concerns have made

similar offers to the Ceylonese government. One of them, Ceylon Minerals Ltd., is backed by National Lead of the U.S. and Hopkins & Williams of Britain.

Plastics/Argentina: Koppers International has just signed a contract with a group of Argentine plastic firms to build a jointly owned polystyrene plant in that country. Koppers will invest \$850,000; Argentine partners will put up \$300,000. The new unit is expected to turn out 5.5 to 6.6 million lbs. of polystyrene annually. Production is scheduled for next year.

Pharmaceuticals/Argentina: Chas. Pfizer and Brandt Laboratories of Buenos Aires have formed a jointly owned Argentine subsidiary to produce pharmaceuticals—particularly antibiotics—in that country. The new unit will represent a combined investment of \$5-6 million and will probably be producing by late '56.

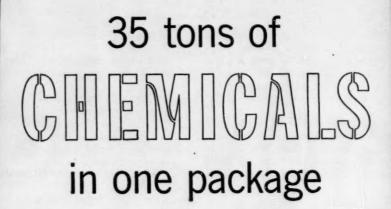
Serum/Argentina: Representing its first venture outside the U.S., Cutter Labs (Berkeley Calif.) will form a jointly owned corporation with Serum-Quimica Argentina of Buenos Aires.

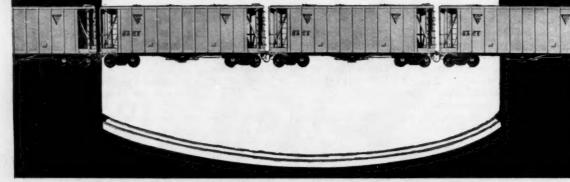
The new company will be called Cutter-Quimica Argentina.

Uranium/Australia: Under an agreement with the Australian government, Britain's Atomic Energy Authority will buy more than \$89.6 million worth of uranium oxide from Mary Kathleen Uranium Ltd., one of the member companies in the Rio Pinto group. A new \$22.4-million treatment plant is to be built at the Australian firm's mine in northwest Queensland, with startup of operations scheduled for 1959.

Basic Chemicals/Israel: A new American-Israeli basic chemicals plant will begin operations this month near Acre, Israel. The American partner in the \$3-million venture is Electrochemical Industries of Ohio. Some financing was also provided by French investors reported to be representatives of the large French producers Pechiney and Progil. The new installation is expected to produce 3,000 tons of chlorine and 3,000 tons of caustic soda annually. In addition, benzene hexachloride and other agricultural chemicals will be manufactured for domestic and foreign markets.

Flour, starch, plastics, sugar—these are a few of the many products successfully shipped in General American's Airslide Car.





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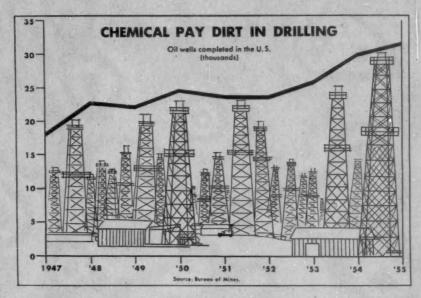
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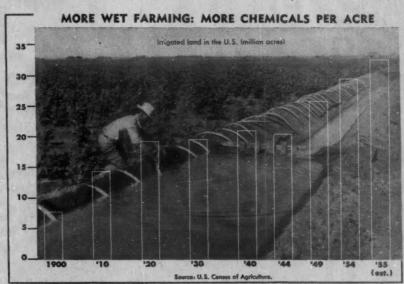
### Charting Business

CHEMICAL WEEK March 24, 1956



BESIDES being a big source of petrochemicals, oil wells are a large and growing market for chemicals. There are additives for drilling muds and special cements (CW, March 17, p. 148); explosives for stubborn wells; acid for cutting through limestone; inhibitors and

blanket solutions for controlling the acidizing; solvents to remove paraffin deposits; sealing compounds to make rock walls air-tight; and thermosetting plastics that—in some instances—can take the place of cements. For most, usage per well is on the way up.

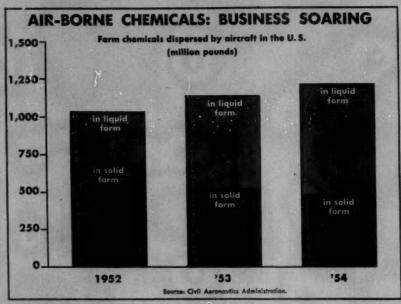


OVING up in bigger jumps each year is the extent of irrigation farming in the western U.S.—and with it the actual and prospective market for numerous agricultural chemicals. Wet farming is more intensive farming—more fertilizers and pesticides are needed for

each acre. Where a corn farmer has raised 50 bu./acre without adding nitrogen in dry farming, he'll have to use 120 lbs. of nitrogen per acre to attain the 110-bu. yield made possible by irrigation. Other chemical aids: soil conditioners, ion-exchange materials.

# **Charting Business**

(Continued)

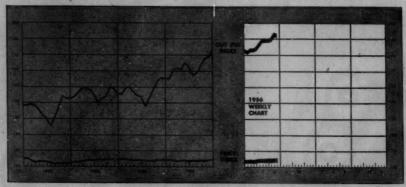


R ISING reliance on airplanes for spreading pesticides — and even some fertilizers—may be broadening the market for farm chemicals. Farmers who previously have passed up these products for a number of reasons—too much cropland for workers to cover in a brief

period, too much damage to plants from tractors, or excessive outlay for labor costs—may now be turning toward full utilization of these chemicals.

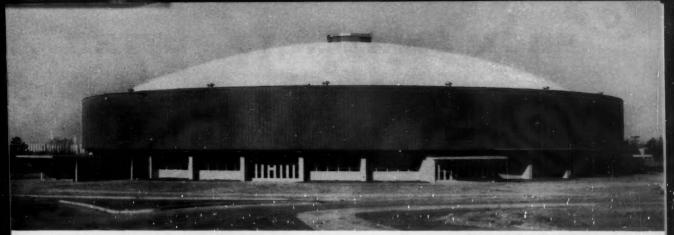
Added encouragement: production of planes specially designed for spreading farm chemicals.

### BUSINESS INDICATORS



WEEKLY	Latest	Preceding	Year
	Week	Week	Ago
Chemical Week Output Index (1947-49=100) Chemical Week Wholesale Price Index (1947=100)	182.5	182.5	161.9
	105.7	105.6	103.9
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	502.9	485.2	358.3

MONTHLY	Mani	ufacturers' S	ales	Manufacturers' Inventories			
Trade (million dollars)	Latest	Preceding Month	Year Ago	Latest	Preceding Month	Year Ago	
All Manufacturing Chemicals and allied products Petroleum and coal products	1,918	27,300 1,959 2,495	24,287 1,740 2,293	46,217 3,283 2,741	45,885 3,199 2,731	43,196 3,020 2,634	



"this paint job should last at least 8 to 10 years" "Secoton" Hi-Build Vinyl Coatings used to protect this unique steel athletic building are marketed by Surface Engineering Company, Inc., Wichita 1, Kans., from coatings produced by Dennis Chemical Co.

"... and that's only the minimum years of freedom from periodic repainting expected for steelwork of the new University of Wichita field house," reports D. W. Davison, Surface Engineering Company, Inc.

Completely round in design and featuring a facade of insulated steel paneling, the more than 25,000 sq. ft. of exposed steel is protected by a special "membrane" coating based on BAKELITE Brand Vinyl Resins.

Applied by spray, the coating builds a protective film several times the thickness of conventional paints. According to the supplier, it is virtually impervious to penetration by moisture and industrial acids, is non-oxidizing and even resists severe hammer blows, or boiling or baking at 300 deg. F.

It isn't surprising. Coatings based on Bakelite Resins have a long record of unusually trouble-free service in this and many other applications. They are formulated for all types of surfaces, materials and structures, exteriors and interiors, under ordinary or extremely severe conditions of service, weather and environment. Why not find out how you can use coatings based on Bakelite Resins to advantage. For a list of suppliers and our "Coatings" booklet, write Dept. NI-34.



### FROM PAINTER TO PUTTER . . .



### Which of these materials do you need? Call RCI!

- 1 RCI alkyd and amine resins can be combined to produce surface coatings for a wide variety of kitchen applications ranging from furniture finishes to durable refrigerator enamels. There's also a big market for the amines in the paper industry which uses them to add wet strength to paper towels, which have become almost a kitchen necessity.
- 2 RC1 polyester resins reinforced with fibrous glass form attractive translucent sliding doors for kitchen cabinets. Other RCI polyesters can be used to formulate polyurethane foams for cushioning dinette chairs.
- are utilized in fast-curing molding compounds for heat-resistant utensil and appliance handles ... filler sheets for laminated kitchen counter tops. (Both phenolic and reinforced polyester resins are

- now being used experimentally in golf club shafts of several different designs.)
- 4 RCI phthalic anhydride constitutes a base for plasticizers used in the manufacture of vinyl floor tile.
- 3 RCI pure and modified phenolic resins make floor waxes and polishes harder and longer-lived.
- 6 RCI pentachlorophenol— is an important ingredient in preservative solutions which help make wood exposed to weather last up to 4 times as long as untreated wood.

The next time you have a supply problem (or a technical problem), take a look at RCI. See where fast delivery of quality-controlled RCI materials (including the basic chemicals listed with our signature) can help you.

# . RCI is in the Picture!



AT RCI—tank car is loaded with a new non-drying alkyd resin developed by Reichhold for use with amine resins in superior baking enamels for home laundry equipment. The big advantage is that...



**DETERGENTS WON'T DULL** glossy enamels for automatic washers made with this RCI alkyd...an advantage every housewife (and manufacturer of industrial finishes) can appreciate.



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in Progress



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Sodium Sulfite • Pentaerythritol • Pentachlorophenol • Sulfuric Acid

REICHHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N. Y.

# ADMINISTRATION

# PROGRAMS FOR PROGRESS State Activities Recently Proposed ( $\vee$ ) or Under Way ( $\vee$ $\vee$ )

	Industrial Consulting Arrangements	Local and Statewide Studies	Credit and Development Groups	Legislation for Industrial Development	Commissions or Industrial Teams
Arkansas	VV		111		
Colorado				VV	
Connecticut	VV		VV		
Georgia			VV		
Idaho .		VV			
Kansas		VV		-	
Kentucky	8				VV
Louisiana		V			V
Michigan			V	V	
Mississippi	V				V
No. Carolina			VV		
N. Mexico				V	
New York			VV	V	
Pennsylvania		VV		V	V
South Dakota			V		
Tennessee				V	
Virginia		V			
W. Virginia				V	
Wisconsin			111	1. 1	

# Glad Hands and Welcome Mats

State governments are casting "come hither" glances at chemical companies. This week, at least 19 states are booming their advantages via old and new techniques (see table, above).

Bulk of the activities center on forming state or privately sponsored credit groups empowered to extend financial aid to industrial concerns, or to communities seeking industrial development. Further activity stems from legislation providing funds for studies, surveys, industrial commissions or consulting services.

What They Seek: General philos-

ophy of all was expressed by West Virginia Governor William Marland during a three-day visit to New York, during which he held luncheons for top executives of numerous industries. Said Marland: "We're interested in growth industries. We want to talk with companies planning expansion, because we think we have much to offer as a location for a branch plant or regional distribution facility."

And West Virginia's enticement program has been no slouch. Aside from gubernatorial barnstorming, the state has just voted \$250,000 for the upcoming year's development program, has been promoting its chemical advantages for several years.

Financial Aid: In Pennsylvania, Governor George Leader is seeking an appropriation of \$5 million to extend to local development groups for boosting business opportunities in the state's critical economic areas. The funds would finance second mortgages on producing facilities. Meanwhile, planning commissions of three counties are running a state-financed study to discover local potentialities for absorbing more industry.

A number of states have recently authorized industrial commissions that will study and promote statewide industrial advantages, provide information facilities for interested industries. Kentucky, Louisiana, Mississippi and Pennsylvania have recently named team members or asked enabling legislation. Kentucky is well along, has scheduled a two-day tour of manufacturing facilities for the business press and others.

Consulting Teams: In Arkansas, a triple-threat team will work specifically to bring in chemical manufacturing. The state has already set aside \$1 million to help municipal development groups, will use a three-prong attack to get a "man-size share of the chemical industry." Team members:

 Robert S. Aries of New York, a chemical consultant with experience in planning for over 100 chemical firms.

• University of Arkansas's Industrial Research Center at Little Rock.

 A committee of Arkansans representing chemistry, engineering and management professional groups.

In eight states, credit groups are well under way to provide industry with financing. In New York, for example, Governor Harriman has announced that the N.Y. Business Development Corporation is "ready to process loan applications" from communities seeking industry. Georgia's Chamber of Commerce has recently approved a credit plan to provide industry with normally unavailable expansion risk capital.

Surveys: Typical of state study programs is a Kansas survey recently completed on the manufacture of petrochemicals. Result: a prediction by the Kansas Industrial Development Commission that Kansas will soon be a leading producer of raw materials for the petrochemical industry. In Idaho, a survey has been launched to find out just how much industrial expansion each of the state's villages, towns and cities could handle in addition to present developments.

In all, the states are making mighty efforts to attract industry. And the site-hungry chemical industry, already slated for \$1.6 billion of new construction in 1956 and '57, is looking for all the on-the-spot help and information it can get.

## Perils in Profits: No Letup

The shifting lineup of the federal government's law enforcement team poses no new antitrust threat to chemical companies, even the biggest and most prosperous; but neither does it bode a letup in vigilance.

A new Assistant Attorney General will be appointed to head the Justice Dept.'s Antitrust Division, and the Federal Trade Commission — which shares responsibility for policing these laws—has been under new management since last fall. Both agencies say their plans are unchanged.

And some management men breathed a snort of satisfaction at news that Stanley Barnes—now head of the Antitrust Division—is being nominated as a Court of Appeals judge.

Voices New Warning: Some feel Barnes has been too active and too severe during his two years as the nation's chief trust-buster. Only last week, for instance, he jarred some members of the business community with a warning that General Motors should divorce some of its divisions.

Meanwhile, FTC diligently keeps its score charts on how the "big boys" are doing in each industry (see table, below). This is just one of that agency's devices to sniff out possible overconcentration in an industry.

Using a somewhat simplified formula and latest company reports, CW has brought FTC's "rate of return" readings up to date for the four companies that have been biggest in industrial chemicals over the past 15 years—Du Pont, Union Carbide, Allied and Dow. Apparent conclusion: these firms are thriving, but their profits put them in no immediate peril of litigation.

### SUCCESS - UNDER SURVEILLANCE

(FTC's figures on selected U.S. chemical companies' rates of return)

	1940	1941	1940	1949	1930	1901	1952	1953
Industrial Chemical	8							
4 largest companies	16.0%	18.0%	20.4%	21.2%	26.4%	19.7%	17.9%	17.7%
23 other companies	10.9	15.3	14.7	11.6	16.9	13.2	10.1	10.2
Rayon								
2 largest companies	7.4	17.5	21.2	12.4	18.1	12.7	10.0	6.9
3 other companies	13.0	24.1	22.5	12.3	18.0	10.7	6.3	10.7
Soap, Cleaning and								
Polishing Preparati	ons							
4 largest companies*	17.7	25.5	22.4	11.7	21.0	14.0	12.1	12.0
3 other companies**	16.4	15.3	4.3	-12.6	6.2	-4.8	4.9	-4.3

### (CW's figures on rates of return of four largest industrial chemical companies)

	1953	1954	1955
Stockholders' investment . (in millions)	\$2,982	\$3,166	\$3,427
Net income (in millions)	418.9	518.1	673.6
Rate of return	14.0%	16.3%	19.6%

\*Does not include the industry's third-largest corporation, for which financial data are not published.
\*\*Does include industry's third-largest corporation.

### Chemical Labor Costs: No Parity in Sight

(Average hourly earnings of chemical workers)

		1951	1955	1956	% Increase, 1951-56	
U.S.		\$1.63	\$1.99	\$2.05	25.8%	
West	Germany	0.35	0.471/2	0.52	48.6%	

(Range of effective hourly wage rates for chemical workers in West Germany)

	1955	1956
Unskilled helpers	43.9¢	47.6¢
Skilled operators	52.5¢	59.6¢

# Long Wait on Wages

Don't hold your breath while waiting for Europe's chemical labor costs to come up to U.S. levels.

Important because they're a factor in international trade and tariff, wage rates in European chemical industries are rising, but slowly. Whether they're actually gaining on U.S. pay scales depends on the arithmetic used.

Over the past five years, chemical wages have been climbing by 5.1%/year in the U.S. and by 9.7%/year in West Germany, based on new contracts between that country's chemical industry employers' association and the labor unions. If these trends continue year after year, it will be 1994 before rates in the two countries are about equal.

U.S. Lead Widening: But if you go by absolute increments, then your conclusion will be that Europe will never catch up in this respect. Since 1951, U.S. chemical employers have hoisted their employees' average hourly earnings by 42¢, while West German chemical earnings have risen by only 17¢ over that same period. On this basis, the U.S. is widening its lead each year (see table, above).

In testimony on tariff and antidumping bills, U.S. chemical management men have consistently maintained that low wage rates abroad give foreign producers a hefty competitive advantage on numerous products entering the U.S. market. In some cases, rising imports of European chemicals are said to be endangering sectors of the industry that would be badly needed in case of mobilization for national defense.

Anxiety on this score won't be eased

by the new over-all wage agreement in West Germany, where chemical production is even higher than its prewar peak.

Significance of the new pay scales is underlined by latest figures on how West Germany's chemical employment has grown since World War II: with a population of about 50 million, West Germany has approximately 300,000 hourly paid chemical workers and 100,000 salaried employees; the U.S.—with a population of 165 million—has a chemical industry force of about 558,000 plant workers and 271,000 salaried employees.

9% and 16%: The new wage pacts—one for each of West Germany's 11 states and another for West Berlin—call for increases of about 9% in minimum wage rates. These rates represent about a 16% increase for the industry's women workers, who—under a recent decision by the federal labor court—are now to receive equal pay for equal work.

Actual wage rates (see table) generally will stay 30-40% above the minimum levels stipulated in the bargaining agreements. In addition, German chemical companies grant such fringe benefits as pension plans, health and accident insurance, payments for recreational facilities, kindergartens, subsidies to canteens, and payments for company-owned houses and apartments.

Chief architect of the new West German wage contracts this year was 65-year-old Fritz Faubel, managing director of the employers' association and a member of the staff of Farbenfabriken Bayer. Faubel truncated the

unions' higher wage demands and also staved off their bid for reducing the work week from 48 to 45 hours.

Though the new contracts call for continuation of the industry's customary 48-hour week, it's expected that again this year the plants will be busy enough to require overtime work as a fairly regular thing. As of last month, actual time worked in West German chemical plants has been averaging 50.1 hours week for men and 49.2 hours for women.

Only Farbwerke Hoechst and its subsidiaries have adopted the 45-hour week. This came as a voluntary and experimental move, and other firms are waiting to see how it works out.

Some Higher Prices: It's likely that West Germany's higher labor costs will have an effect on prices of chemicals, though export price tags probably won't change much. One factor in this field: Britain is striving again to step up exports, and British wage rates definitely aren't rising this season. German exporters can be counted on to fight hard to keep from losing chemical markets to their British rivals.

In the U.S., the new West German chemical wage rates aren't expected to alter the present situation. Where there's competition with domestic producers, that competition will continue—or even increase. With U.S. wages continuing to move upward, it's a cinch that West German and other European chemical firms will keep right on enjoying a competitive advantage on certain items for a long, long time to come.

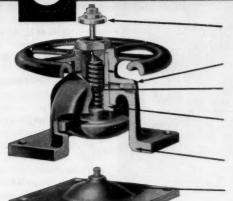


GERMANY'S FAUBEL: New pay scales, but still well below U.S.

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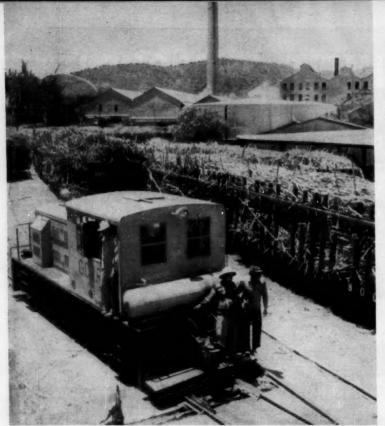
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PUERTO RICAN CANE: As handy raw material, it's one big element in . .

# Site Pickers' Dope Sheets

With chemical expansion continuing at a fast clip this year and with states and cities actively competing for new chemical plants (see p. 28), both groups are making heavier use of site location reports drawn up by economic research specialists.

Two such reports being read by management this week — one on whether an integrated plant for calcium carbide, chlorine and derivatives would pay off in power-rich Klickitat County, Washington; the other on whether a synthetic fiber plant in Puerto Rico could compete with mainland producers—provide a vantage point for looking into these plant site "dope sheets": How are they put together, and how much faith can you put in their conclusions?

Theoretical Approach: Grounded on assumptions and cemented together with hypotheses, the factual bricks in such a report frequently make up a structure that's deemed substantial enough to support a decision for a multimillion-dollar investment.

The basic formula is simple enough; there are two principal factors, both

of which are fairly well known to begin with:

- Where are the chief sources of raw materials?
- Where are the major markets for the end products?

After those two points—origin and destination—are fixed, the task boils

down to hard-headed application of chemical engineering, economics and arithmetic to fill in the details. And though technology and arithmetic are pretty much the same wherever you go, there's enough diversity of economic conditions at various locations to make for some answers that—on the surface, at least—are not just what one would expect.

Island Site Favored: In the study on "Location Factors in Synthetic Fiber Production" by Joseph Airov at MIT's Center for Urban and Regional Studies (CW, Mar. 12, p. 12), the author concluded that Puerto Rico should be a strong contender for such a plant, even though the island is more than 1,000 nautical miles from both the petrochemical-producing Gulf Coast of Texas and from this country's biggest markets for textile fibers.

From just the standpoint of raw materials to make the chemical intermediates, Airov finds that the top location would be Orange, Tex., or vicinity. For best location near the markets, he picks Institute, W. Va. Or, he goes on, you might make the nylon salt or other petrochemical intermediates at Orange, then form into fibers at Institute.

But Airov sees a considerable saving—mainly due to much lower labor cost—in placing a staple fiber plant in Puerto Rico. He rules out the Texas-Gulf Coast area because of high wage rates there, and frowns on New England because of high costs of fuel and electric power. West Virginia, Airov concedes, stands a good chance



NEW OIL REFINERY: For island territory, another industry enticement.





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EPOLENE is a new low-viscosity,

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highly compatible and

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E polene is a new synthetic wax, offering users the double advantages of steady supply and stable price.

Epolene is a hard, tough wax, comparing favorably in this respect with high-priced natural waxes such as carnauba. It is compatible with a wide range of other waxes, elastomers and resins. Its inherent toughness and its ability to plasticize other materials to which it is added extends its usefulness. Epolene is highly resistant to the attack of many chemicals and is not dissolved by organic solvents at room temperature. It polishes, it produces films of high gloss, high slip resistance and good scuff resistance.

Blended with other waxes, it increases hardness, melting point, blocking temperature, dielectric strength, abrasion resistance, toughness and flexibility.

Epolene is available in two forms: Epolene "N"—a non-emulsifiable type for direct blending with paraffin and other materials; Epolene "E"—an emulsifiable type for the preparation of emulsions used in the manufacture

of polishes, paper, textile finishes and other coatings.

Epolene is easy to use. It comes in the form of pellets approximating the size of rice grains. These melt down rapidly for incorporation with other materials. In upgrading paraffin, Epolene can be quickly blended with the paraffin at temperatures as low as 180° F.

The outstanding uniformity of Epolene also contributes to its easy use and makes possible exact control of wax blending or emulsifying. Viscosity is low and carefully maintained from shipment to shipment. The acid number of the emulsifiable type is held within the narrow limits of 9-10. By standardizing on Epolene you can standardize your formulas and procedures.

Investigate the possible usefulness of Epolene in your product. Its versatile properties make it an interesting commercial material for many uses. For samples and further information, write EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, Chemicals Division, KINGSPORT, TENNESSEE.

Epolene POLYETHYLENE

OLD VERSUS NEW. Scoop of Epolens pellets is shown alongside broken slabs of standard commercial wax. The convenient form of Epolene saves considerable time and expense in handling and brocessing.



SALES OFFICES: Rustman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Mass.; Cincinnati; Cleveland; Chicago; St. Louis; Houston. West Coast: Wilson Meyer Co., San Francisco; Los Angeles; Portland; Sqlt Lake City; Seattle.

because it has raw materials, low-cost power and fuel, and ready access to all the major fiber markets; but it may suffer from higher labor costs in the future.

Despite higher fuel and power costs on the island than at most of the U.S. sites, plus higher transport costs on shipment of chemical intermediates to Puerto Rico and shipment of synthetic fibers back to the mainland, the labor cost advantage in nontechnical jobs makes the island the lowest total-cost site in the study, Airov calculates.

Booster for Klickitat: An equally strong-sounding argument is made by Portland's Ivan Bloch and Associates in behalf of Klickitat County as a location for a plant to turn out these principal products: calcium carbide, acetylene, chlorine, caustic soda, trichlorethylene, perchlorethylene, and vinyl chloride. The report has been shown to management men of Dow Chemical and Imperial Chemical Industries of Britain—both of which have let it be known that they're interested in West Coast expansion possibilities.

Bloch estimates that in 1953 the 11 Western states used products that could have been made from 181,000 tons of calcium carbide; and since only 32,000 tons of carbide were produced in the West, he reckons that there'd be a ready market for the 25,400 tons/year he visualizes as being sold in that form from a hypothetical plant on the Columbia River below McNary Dam. That river and the Pacific Ocean would provide a year-round waterway to all major West Coast industrial centers.

Both Bloch and Airov, though enthusiastic in some of their reasoning, caution management to stop, look and listen before making the postulated plunge. Airov predicts that some fiber plants ultimately will be attracted to Puerto Rico, "but not until the industry's production, marketing, and research problems have been solved first in the U.S." And Bloch acknowledges that "market conditions for some of the principal products will warrant considerably more examination."

Thus it appears that while these "outside reports" can be helpful in marshaling much-needed information, chemical management must continue to have its own people check those findings before making any big expansion decisions.



SOUTHERN CHEMICAL WORKERS: New industry law prompts question . . .

# For Dixie: Spiraling Wages?

Chemical companies in the South, where the new \$1/hour minimum wage law is affecting a greater proportion (28%) of workers than anywhere else, this week express widespread concern that the new rate will spiral earnings for their employees. And this even though most wage rates are already above the \$1.50 mark. An 8-state CW survey shows little immediate effect on Southern chemical payrolls, but a likelihood of gradual increases in the next few months.

Back of this is the fact that many employees in such consumer industries as laundering and clothing manufacture, along with still more in woodpulp and timber preparation, are receiving increases up to the new minimum. Higher paid employees are expected to seek proportional increases to maintain the old differentials, thus hoisting regional wage levels all along the line.

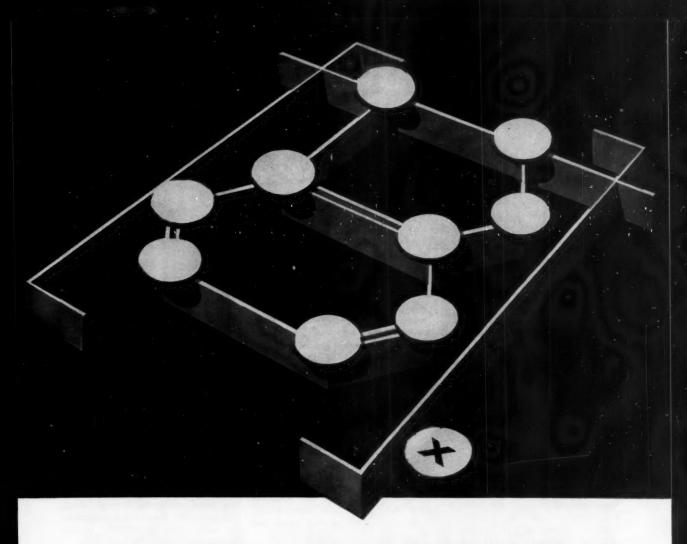
Past History: Federal Reserve records in Virginia and the Carolinas show that previous rises in minimum wage rates have been closely followed by a general upward adjustment of wages above the new minimums. Already, all labor unions concerned have announced that campaigns will be started immediately for corresponding upward adjustments for earners of higher wages. Moreover, Congressional labor lobbies are pushing demands to extend the definition of interstate commerce to include some

businesses that are now exempt. However, strong opposition from those retail and service groups is expected to prevent passage this session.

Some manufacturers report they will intensify efforts to increase process mechanization to keep costs down; still others report the situation has been approached by combining jobs, laying off workers. Hardest hit of chemical operations are small fertilizer processors; estimates indicate some 40% of employees in this classification received wage hikes. Many employers will have to raise prices to compensate for higher labor costs.

In Washington, the administrator of the new wage-hour law, Newell Brown, is minimizing the differential factor, says past experience shows it hasn't had much effect. At the same time he anticipates an influx of enforcement problems, is planning to step up investigations from 1955's 40,000 companies to 67,000 of the 800,000 affected total. Last year, more than half of the companies checked had committed some sort of violation, for the most part unintentional, affecting 130,000 workers.

To what degree Southern chemical wages will be hit is still open to question, but there's little doubt in management's mind that—sooner or later—the new minimum wage law will force Southern pay rates a little closer to Northern levels.



# Neville Coumarone-Indene Resins Have Improved Many Products—Yours Could Be One Of Them

In the manufacture of many products from paints to rubber tires and floor tile to chewing gum, Neville resins have long proved their ability to help make better looking, longer wearing, more salable merchandise. Neville produces an extremely wide range of coumarone-indene resins under the most exacting of specifications, and conducts broad and constant research on their mutually profitable use in many types of products. If you have an item which is conceivably applicable, we suggest you send for further information. Without obligation, our chemists will work with

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VICE-PRESIDENT NIXON: To get compliance, he exerts gentle pressure.

#### **Persuasion Proponent**

A few chemical process companies have been feeling the gentle pressure being exerted from time to time by President Eisenhower's Committee on Government Contracts.

This week, in its second annual report, that committee—headed by Vice-President Nixon and including 14 high-ranking members representing industry, labor and government—is claiming "substantial progress and encouraging results" in its campaign to end discrimination against Negroes and other minority groups in employment and promotion practices on government contracts.

Under federal law, all such contracts contain a clause binding the contractor to hire, train and promote employees on the basis of ability, without regard to race, color, religion or national origin. To get compliance, Nixon's group has been using—as tactfully as possible—its powers of education, persuasion, conciliation and negotiation. So far, it hasn't resorted to coercion.

Management Willing: Certainly the most dramatic work of the committee is in handling complaints that contractors' practices are falling short of the legal standards. Since its creation in 1953, the committee has received 147 of these complaints, including 82 that came in during the past year.

In many cases, it appears that management is willing to change its

personnel policies to be eligible for government business. Corrective action is suggested by the governmental agency that has let the contract; sometimes officials of Cabinet rank have carried the recommendations to contractor management.

The committee gives resumes of some 34 cases in which the contractor was given suggestions on how to reach full compliance. Four of these involve chemical or petroleum companies, and illustrate how the committee has been handling complaints.

Sixfold Rise: One complaint charged that a large corporation operating a plant for the Atomic Energy Commission had been employing Negroes as janitors, coal handlers and laborers only, and was not pemitting Negroes to enter certain special training schools. Nixon's committee asked the company to keep records on such matters, and within two years the number of Negro employees increased from 76 to 443, including 25 professional and technical employees.

Another chemical concern, holding a contract with the General Services Administration, agreed to revise its employment policies and to begin hiring Negroes in jobs previously closed to them. Two oil refineries with Army contracts dropped discriminatory rules against Jews and Negroes.

The Nixon committee has also helped contracting agencies set up methods to administer the plan, and has conducted several educational programs. One new educational technique developed by the committee—and soon to be distributed to executives of companies with government contracts —is an evaluation questionnaire. By posing a set of seven questions, it's designed to help executives determine whether their company has actually eliminated racial and religious discrimination in employment practices.

## LEGAL. . . . . .

Fluoridation Upheld: In every case where fluoridation of public water supplies has been court-tested it's been upheld, says a report issued by the New York office of the U.S. Dept. of Health, Education & Welfare. Berwyn F. Mattison, Pennsylvania's Secretary of Health, cited the report as "proof that this public health measure is both legal and desirable."

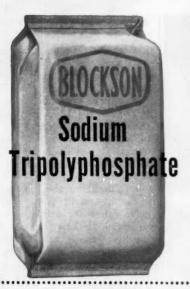


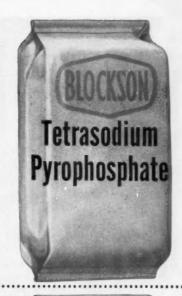
SECRETARY MATTISON: Where it was tested, fluoridation was cleared.

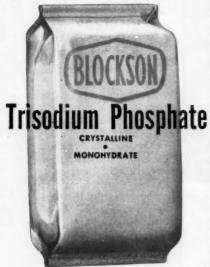
Anyone who studies these cases, Mattison says, "will see that when individuals who oppose fluoridation can be confronted with the evidence and questioned suitably, as is possible in court, not one of their arguments can be upheld." The report summarizes the 18 cases since 1952 in which plaintiffs in 13 states and Canada have attempted through court action to halt fluoridation programs. In every case the courts upheld fluoridation.

Harassing Agents: How long can the federal Internal Revenue Service pry into the affairs of a company concerning income tax payments? The question was asked last week in a suit brought by a Louisville, Kv., businessman who owns and runs a number of enterprises, including a chemical plant. J. Graham Brown charges IRS with having "harassed" him and his companies since 1952, and asks for temporary and permanent injunctions to prohibit agents from entering into more "re-examinations and reinvestigations" on 1952 income tax returns of the Brown interests. Brown claims the investigations were "settled and closed" after considerable distraction of employees who assisted in them, says he fears the agents will proceed "capriciously" with new examinations.

Pollution and Permits: Building permits, when zoning and building requirements are met, can't be denied









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#### ADMINISTRATION.

just because the manufacturing processes create a nuisance. That's the opinion handed down last week by the New York Supreme Court in Buffalo, in ordering the Cheektowaga, N.Y., town board to issue a permit to U.S. Rubber Reclaiming Co. The rubber firm is attempting to concentrate all its facilities in Cheektowaga, already has one plant there; the permit is to make additions to it. Cheektowaga town attorneys have twice refused the permit until "obnoxious fumes" from the existing plant are eliminated. Justice Carlton A. Fisher, in signing the order, said "the question of any alleged nuisance is not material in this proceeding . . . and other remedies to correct [the odor problem], if any exists, are available to the respondents."

#### LABOR. . . . .

Employment Up: With production holding at a high rate and new plants coming onstream each month, employment in chemicals and allied products this past winter has been at its highest level on record. Total employment was up to 829,300, including 558,400 production and maintenance workers and 270,900 salaried employees. This represents a 4.5% gain in total employment over the past 12 months, and a net increase of 7,400 production and maintenance workers since the crash-basis production days of World War II. It's noteworthy that this over-all rise in chemical employment has taken place alongside the industry's mammoth modernization and mechanization program, indicating that automation in this industry doesn't cut into total number of jobs.

Members Not Barred: A labor union may not be able to speak up for employees at a given plant, but the union's members in that plant still have the right-acting as individual employees-to appeal to the National Labor Relations Board. So says Judge John Danaher of the U.S. Court of Appeals at Washington, with Judge E. Barrett Prettyman concurring and Judge Wilbur Miller dissenting. The company in a New Jersey case argued that employees who had filed charges of unfair labor practices were merely "fronting" for a union that has not complied with the Taft-Hartley Act's with the greatest of ease.

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#### ADMINISTRATION. . .



JUDGE DANAHER: Union may be ineligible, but workers can still act.

requirement for signing non-Communist affidavits. The case may go to the Supreme Court for further review.

Another Stock Plan: Still another chemical company is coming out with a stock purchase plan for employees. Hooker Electrochemical's stockholders have okayed a twofold stock plan, covering 10 years and offering up to 300,-000 shares for officers and key employees and another 300,000 shares for all other employees. In the former program, options can be taken on not more than 5,000 shares apiece at 95% of latest reported sale price. Other employees will be allowed to buy stock at about 85% of closing market price on date of offering.

Triple Action on Bargaining: The company council recently organized by locals of the Oil, Chemical & Atomic Workers (AFL-CIO) that represent employees at Union Carbide and Carbon plants is expanding its program to allow for joint action with two other AFL-CIO unions holding contracts with that company: International Chemical Workers Union and United Steelworkers of America. All three groups are represented in a steering committee set up at a meeting in Cleveland. General objective will be to coordinate bargaining at all Carbide plants, starting with pension, insurance, hospitalization and surgical plans.



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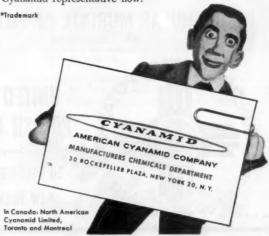
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#### ADMINISTRATION. .

#### KEY CHANGES

Birny Mason, Jr., to president, and R. E. Cornwell, E. J. Fox, and J. J. Murphy, to vice-presidents, Union Carbide Development Co. (New York).

S. Crawford and Frank G. Fackler, to vice-presidents, Stein-Davies Co. (Long Island City, New York).

George W. Blackwood to president, and William L. Taggart, Jr., to vice-president, Dewey and Almy Chemical Co.; Henry L. Gilbert, to president, Dewey and Almy Overseas Co.; Bradley Dewey, Jr., to president, and E. N. Funkhouser, to vice-president, The Cryovac Co.; T. T. Miller, to president, and Elwyn E. Winne, to vice-president, Polymer Chemicals; all divisions of W. R. Grace & Co. (New York).

Herbert Trotter, Jr., to vice-president, The Sharples Corp. (Philadelphia).

Harold L. Hansen, to vice-president, Sterling Drug Co. (New York).

E. W. Reid, to board chairman, and William T. Brady, to president, Corn Products Refining Co. (New York).

Charles T. Zaoral and Lee B. Morey, to directors, Vanadium Corp. of America (New York).

Robert O. Sauer, to vice-president, Velsicol Chemical Corp. (Chicago).

F. A. Button and W. F. Talley, to vice-presidents, Conco Chemical Co. (Dallas).

Louis G. McCulloch, to director and president, and Roger Belzil, to vice-president, Polychemical Industries Ltd. (Edmonton, Alta.).

M. C. Irani, to vice-president, Metals Chloride Division, Salem-Brosius, Inc. (Pittsburgh).

Arthur C. Treece, to general manager, plastics department, General Electric Co. (Pittsfield, Mass.).

Fred H. Reed, to assistant to the president, United States Chemical Milling Corp. (Culver City, Calif.).

Mrs. William T. Haebler and Henry G. Walter, Jr., to directors, van Ameringen-Haebler, Inc. (New York).

Thomas L. Gresham, to vice-president, A. E. Staley Manufacturing Co. (Decatur, Ill.).

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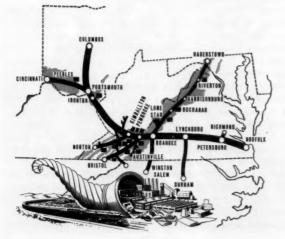
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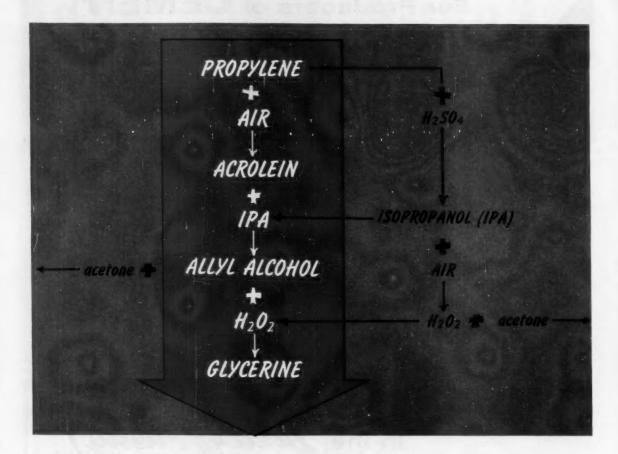
Construction is booming in and around *The Land of Plenty*. If you locate your plant here, you'll be near your market as well as near your raw material.



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# Picture of a New Process

The last piece in a jigsaw puzzle fell into place recently as Shell Chemical received U.S. Pat. 2,731,502 on a hydroxylation that is the likely last step in the firm's new glycerine process. The completed picture (above) is a primer in process development.

The new operation is simple enough if you consider only the raw material and the finished product; it starts with propylene at 1-2¢/lb. and ends with glycerine, which sells for 30¢/lb. That, in fact, is exactly what Shell does in its older process—the present commercial glycerine synthesis.

But between propylene and glycerine there's a vast amount of chemical engineering\*, a complex series of processes leading up to the end-product and the important by-product, acetone.

Across the Bond: Right from the start, Shell has shrouded the project in mystery. It says only that it will build a series of plants, starting with a 30-million-lb./year hydrogen peroxide unit and including plants to make acrolein and glycerine.

But it's been apparent, too, that Shell would wheel out its isopropanol oxidation process to yield the hydrogen peroxide (and acetone), use an air oxidation of propylene to make acrolein (CW, May 7, '55, p. 72).

The uncertainty about how Shell would go from acrolein and peroxide to glycerine could be resolved by this latest patent: it gives the company what looks like a practical commercial route via allyl alcohol. This, then, is how the various processes shape up,

how they probably tie together:

- Isopropanol. Shell can start with propylene, convert it into isopropanol by conventional techniques—e.g., addition of sulfuric acid to form the sulfate, followed by hydrolysis. That's the only conventional process in the entire line-up.
- Acrolein. Some of the propylene will be used to make acrolein by a direct, catalytic air oxidation (U.S. Pat. 2,451,486). The reaction proceeds at 200-400 C, gives high (up to 86%) yields.
- Hydrogen peroxide. Part of the isopropanol will be fed to a reactor, where, in the liquid phase, it will react with air to produce hydrogen peroxide and large amounts of acetone (U.S. Pat. 2,376,257). Shell's announced 50-million-lb. peroxide goal would involve an acetone operation in the neighborhood of 50 million lbs./year.
- Allyl alcohol. Theoretically, Shell could go from acrolein to glyceraldehyde, which could be hydrogenated

<sup>&</sup>quot;And some interesting economics: if Shell were to make glycerine from purchased peroxide and acrolein, its raw material charges would be over 50¢/lb. for a product that sells for 30¢/lb. For further evaluation of the economics of the process and intermediates, see CW, May 7, '55, p. 74.



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into glycerine. Problem here is that the operation entails the reduction of the aldehyde and the oxidation of the double bond. Shell has demonstrated that this could be done (U.S. Pat. 2,718,529) with peroxide, by using osmium tetroxide as a catalyst (CW Technology Newsletter, Oct. 8, '55). But it makes more sense, economically, for Shell to first convert the aldehyde group into the hydroxyl. This it can do by reacting the acrolein with some of the isopropanol to produce allyl alcohol and acetone (British Pat. 619,014). Shell has never revealed production figures other than those for hydrogen peroxide, so it isn't possible to estimate the amount of acetone coproduced in this step. But it should add considerably to the acetone made in the peroxide step.

• Glycerine. The allyl alcohol can then be converted into glycerine by hydroxylating with hydrogen peroxide in the presence of a catalyst. Several catalysts (vanadium oxide, chromic oxide, selenium dioxide, even sulfuric acid) can do the job. But, according to the Shell patent, they all leave something to be desired on one count or another. Shell's choice: organic sulfonic acids, particularly alkyl aryl sulfonics.

These acids, as Shell sees it, promote the hydroxylation, also disperse the water-insoluble olefinic compound so that intimate contact between reactants is maintained throughout the reaction. Other advantages of using the sulfonic acids: economy and simplicity—there's no need for expensive techniques to recover the catalyst. Also, the process can be adapted to continuous operation.

In one example, Shell investigators show how 1 mol of hydrogen peroxide reacts with 1.1 mol of allyl alcohol in the presence of 5 mol-percent (based

on peroxide) of p-toluenesulfonic acid. After four hours at 90-98 C, the yield of glycerine (based on peroxide) is 57%. By lowering the temperature the conversion of allyl alcohol drops to only 57%. But the yield (on peroxide) rises to 75%.

It's not possible to predict with certainty just how Shell will proceed. But the smart money is betting heavily that the processes it ultimately selects won't differ markedly from those sketched above.

#### **Corrosion Confab**

Some 2,000 engineers, chemists and metallurgists came from all over the world to New York's Hotel Statler last week for the 12th Annual Conference of the National Assn. of Corrosion Engineers.

Their purpose: to exchange ideas on industrial waste control—or more specifically, corrosion-caused waste—that costs American industry more than \$6 billion each year.

Though a majority of the papers dealt with the mechanisms of various types of corrosion, some of the most interesting sessions, to chemical men at least, were those devoted to the ever-present problem of maintenance painting:

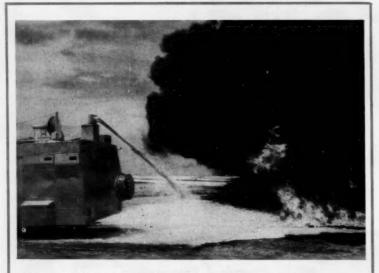
• Du Pont's M. L. Monack, H. W. Shockley and J. R. Allen outlined the vital role that surface preparation, coating selection and proper application play in reducing maintenance painting costs.

• Pennsalt's R. F. Williams and J. H. Cogshall offered an engineering approach to estimating painting costs.

 Carbide's B. C. Wright explored the manpower factor, suggested means of increasing production by use of three types of work measure—productivity, time and motion studies, ratio delay.

Guiding philosophy of all three papers: reduction of painting labor costs, which run to about \$1.5 billion/year, even at the expense of a slight increase in the \$600 million spent annually for paints, varnishes and lacquers.

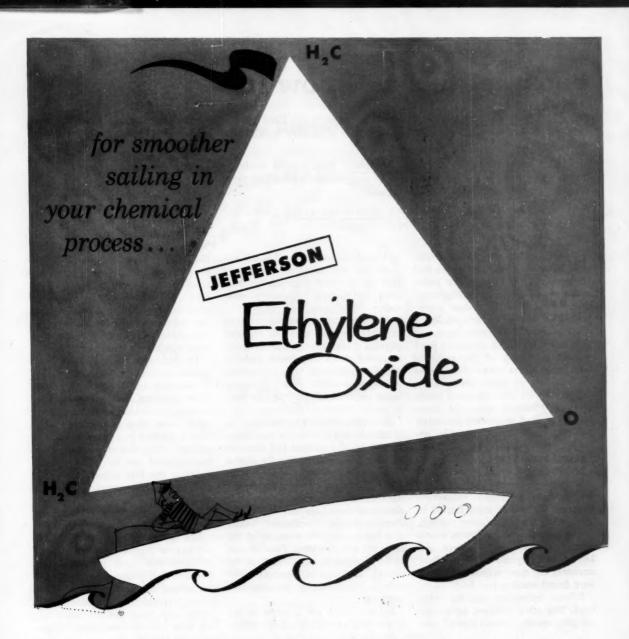
Plastics, too, received special attention as Thursday's symposium cited the high degree of corrosion resistance offered by plastics, both in the form of coatings and as structural materials. The consensus: new plastics are first-class corrosion fighters.



# Fire Fighter Packs a One-Two

LIKE AN EXPERT BOXER, this Australian fire-fighting and rescue tender moves in to uncork a chemical one-two punch consisting of 12,000 gal. of chemical foam, 200 lbs. of carbon dioxide in high-pressure cylinders. Potentially useful for combating petroleum and chemical fires, its a new technique for airplane fire rescue work developed by the Australian Dept. of Civil Aviation. How it works:

foam is sprayed from groundsweep nozzles to clear flames from the area in front of escape port cut out of plane's fuselage by a trepanning saw (mounted on front of tender). The vehicle's three-man crew is protected against outside temperatures up to 600 C by rock wool-insulated, double-skin steel walls and heat-resistant, armoredglass windows, fitted with sliding steel shutters.



This chemical intermediate reacts with water, alcohols and phenols under neutral, acidic and basic conditions.

Introduction of the hydroethyl group or a plurality of oxyethylene groups,  $(OCH_2CH_2-)n$ , lends increased water solubility on the substance treated, proving a valuable means of securing water-soluble derivatives and surface active compounds.

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# **Boom in Nuclear Know-How**

How do you get into nuclear processing? That's what most of the chemical industry's long-range planners would like to know.

Two reasons for their interest: the recent rash of private nuclear power projects, AEC's eagerness to turn peaceful atomic projects over to private industry.

First details of Britain's plutonium plant point out the problems of breaking into radiochemistry.

EVER SINCE AEC invited private industry to enter the nuclear fuel reprocessing field, prospective radio-processors have been scrambling to get in on hitherto-secret nuclear know-how. Last month, the first disclosure of the chemical processes employed at Britain's Windscale plutonium plant pointed out many of the problems (and some of the answers) unique to the treatment of fission products.

The complex radiochemistry developed at Windscale serves the three-fold purpose of recovering plutonium for Britain's A-bomb stockpile, recovering uranium for re-use as nuclear fuel, and preparing waste fission products for disposal.

Extraction Process: To minimize the handling of highly radioactive material, the British plant elected to use a process that eliminates the bulk of the gamma-radiating fission wastes at the earliest possible stage. All known techniques were carefully screened; the most common of these were found wanting (see box).

Solvent extraction, on the other hand, had some inherent advantages —highly specific action, ease of control, convenience of an all-liquid system—that are suited to the remote type of operation required for handling dangerously radioactive materials.

Numerous solvents were investigated to find one that had the required physical characteristics. The list finally narrowed down to dibutyl carbitol, which, in addition to providing the necessary selectivity, resists decomposition under irradiation and is easy to purify by simple distillation.

Radioprocessing: The treatment at Windscale begins with the continuous dissolution of irradiated fuel elements in nitric acid. After ageing for several months to permit decay of short half-life nuclides (particularly radio iodine), the elements are removed from their aluminum containers and fed to the dissolving unit. Continuous, rather than batch, operation is employed because it's self-regulating. Flow of acid to the dissolver is controlled from the outside, discharge of dissolved materials is regulated by constant-level overflows.

Solution from the dissolver is fed to the first extraction column where hexavalent uranium and quadrivalent plutonium are extracted into dibutyl carbitol. Waste fission products are stripped from the mixture by nitric acid, then concentrated and sent to permanent fission storage.

The solvent stream out of the first column is neutralized and plutonium is reduced to the trivalent state by a selective aqueous reagent. The combined solvent-aqueous liquor is then fed to the second column in which it's extracted by a solution containing nitrate ions, stripped by dibutyl carbitol. The uranium-bearing solvent phase is transferred to a third column for backwashing and concentration by evaporation before going to the uranium purification plant.

The plutonium-bearing stream from the second column requires cleaning to eliminate traces of uranium and fission products. This is done by first oxidizing plutonium back to the quadrivalent state, then extracting it with dibutyl carbitol in a fourth extraction column. After fission products have been stripped out by nitric acid, it passes to the fifth column for backwashing and concentration, then on to final purification.

Process Design: Though newcomers to the fuel reprocessing field have the benefit of others' experience, they'll still have to cope with the same basic problems that faced the Windscale planners. And chances are they'll find the unfamiliar requirements for plant layout, shielding, instrumentation, piping, and vessel construction a far cry from conventional chemical engineering practice.

For one thing, the design engineers must consider the limitations imposed by the shielding. Windscale designers solved this by locating externally controlled equipment close to the wall, bringing pipelines out to bulges in the shield where sampling devices and control instruments are located. And by eliminating the major portion of gamma-radiating fission wastes in the first extraction, the British plant requires less shielding against the relatively mild alpha- and beta-radiation encountered in subsequent extraction and purification operations.

And most important, design engineers must avoid "critical" assembly, i.e., an arrangement of equipment

# Three Techniques That Were Rejected

- 1 Precipitation was discarded because the British felt the chemical precipitants would cause severe corrosion problems; also that it would intensify disposal problems due to the large volume of radioactive effluent.
- 2 Distillation was rejected because of the high temperatures it would require.
- 3 Ion exchange which has proved so valuable in extracting uranium ore—was bypassed mainly because of the lack of information on behavior of ion-exchange resins under conditions of intense radiation.

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A complete up-to-date report of the facilities and advantages of Calvert City is now available. Write National Carbide for a copy of "Industrial Resources, Calvert City, Kentucky". Prepared by the Joint Civic Industrial Committee of Calvert City and the Agricultural and Industrial Development Board of Kentucky.

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# National Carbide Company

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NATIONAL CARBIDE COMPANY is a division of AIR REDUCTION COMPANY, INCORPORATED • Principal products of other divisions include: AIRCO — industrial gases, welding and cutting equipment and acetylenic chemicals • OHIO — medical gases and hospital equipment • PURECO — carbon diaxide, liquid-solid ("DRY-ICE") • COLTON — polyvinyl acetates, alcohols, and other synthetic resins.

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#### PRODUCTION .

and piping that permits the accumulation of enough fissionable material to support an uncontrolled chain reaction.

Though instrumentation and remote sampling of radioactive product streams still tax the ingenuity of designers, both functions have benefited from the development of highly sensitive radiation counting devices.

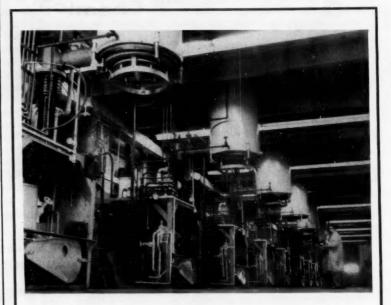
Planned Efficiency: Despite the complete lack of experience in dealing with the unique hazards of fission products in large quantities, the Windscale plant was operating at planned capacity within a few weeks after startup. In fact, operation was improved, plant capacity was increased when bottlenecks failed to materialize.

With this type of know-how now shedding security wraps, it's likely that many chemical companies will be encouraged to enter the fertile field of radiochemical processing.

#### EQUIPMENT

Mass Flowmeter: Latest addition to the growing ranks of mass flow instruments for the chemical process industry (CW, March 3, p. 50) is Industrial Development Laboratories, Inc.'s (Jersey City, N.J.) Electro-Caloric flowmeter. The device is completely electronic, measures flow by utilizing the rate of heat transfer through the boundary layer of the liquid. Measuring elements aren't exposed to the fluid, says IDL, so there's no pressure loss or danger of fouling by corrosive liquids and gases, slurries, or other hard-to-handle products.

Filter Plus: Up to 99% of unfiltered liquid heel can be eliminated, says Niagara Filters Division, American Machine and Metals, Inc. (East Moline, Ill.), by the use of new scavenger leaves on its Style H pres-



# Going Back to Work?

THE BUREAU OF MINES'
Albany, Ore., zirconium pilot plant
has not been humming like this
since Carborundum started commercial zirconium production. But
indications are that the pilot unit
may be put back on the line. The
Atomic Energy Commission has
asked the bureau what would be

required to reactivate it (CW, Technology Newsletter, March 17). And by last week the commission's Pittsburgh office had received 56 bids from industry for operation of the facilities. The 300,000-lbs./year capacity would be used to span the present gap between zirconium supply and demand.

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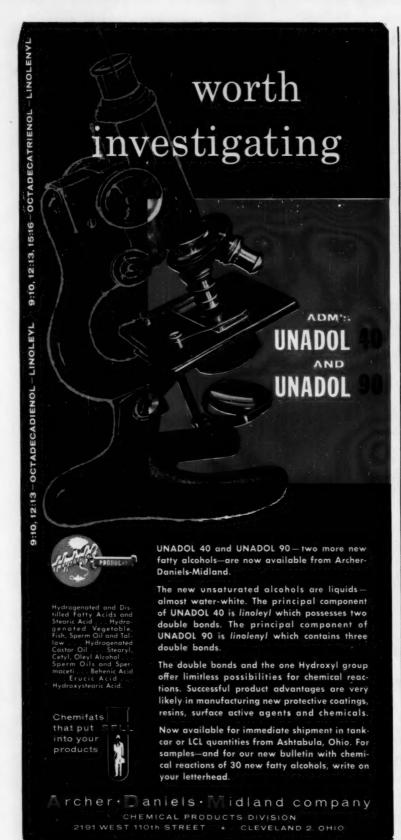
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#### PRODUCTION. . .

sure leaf filters. Mounted on either side of the manifold below the main leaves, the scavengers run lengthwise in the filter tank, swing down into a vertical position for easy cake removal.

Silent Check: For control of water hammer in all types of hot or cold liquid service, The Williams Gauge Co., Inc. (Pittsburgh, Pa.) offers its new Williams-Hager flanged, silent check-valve. Developed to provide water hammer control and durability features at low cost, the simplified unit is made in 1- to 10-in. sizes for pressures of 125-2,500 psi.

Portable Blender: Strong-Scott Manufacturing Co. will soon start producing a new portable blender, designed especially for small or custom installations. Dubbed Porta-Blend, it's said to provide efficient blending, high uniformity of product by combining accurately measured quantities of liquid with controlled amounts of dry ingredients.

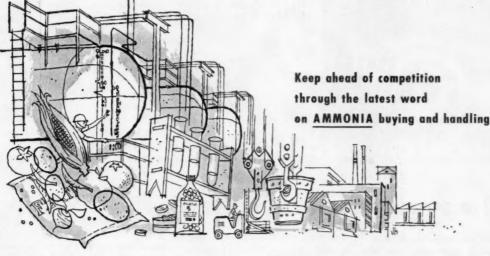
Package Pump: Layne & Bowler Pump Co. (Los Angeles) is out with its new Verti-Line packaged pumping unit for wells as small as 4 in. in diameter. Made in 4- and 6-in. sizes at ratings of 2-7½ hp., they're said to provide efficiencies of more than 80%. Capacities range from 200 to 7,500 gph. at heads to 340 ft.

Filter Felt: By packing the interstices of a specially woven Orlon fabric with short Orlon fibers, Filtration Fabrics Division of Filtration Engineers, Inc. (Newark, N.J.) makes a new felt for wet and dry filtration applications. Dubbed Feon, the fabric is said to be resistant to strong oxidizing chemicals and mineral acids, able to withstand temperatures to 300 F. It's available as yard goods, or tailored to fit any type of filtration or dust collection equipment.

Silica Activator: Wallace & Tiernan Inc. (Belleville, N.J.) offers a new unit—its WT Silicator—for continuous preparation and application of activated silica in water and waste treatment plants. The unit uses chlorine as the activant, is said to be particularly suited to processes that require chlorine—in addition to the silica coagulant—for sterilization or slime control.

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# DISTRIBUTION



AD PLETHORA: Antibiotics-for-food promotion may help meet a big . . .

# Challenge in Modern Selling

In Flatbush and in midtown Manhattan, chemical marketing men of Chas. Pfizer and American Cyanamid are struggling with the really tough problem of how to develop the estimated \$30-million potential domestic market for antibiotics in the preservation of flesh foods—poultry, fish and other meat. And they'll have to be right the first time.

Basically, the problem is how to distribute time. Treatment with Pfizer's oxytetracycline or Cyanamid's chlorotetracycline, the two antibiotics now being actively pushed for inhibiting growth of bacteria in flesh foods, appreciably lengthens shelf-life of meat and fish. Poultry shelf-life, for example, is extended 50-100% over the usual 4-7 days. And therein begins the challenge.

How should this time advantage be allocated among the links in the distribution chain? Four groups in the sales system would like to benefit\*:

\*With the extra time, the processor could ship to more distant markets, possibly buy in larger quantities, level peaks and valleys in production, and assume more of the cut-up and bagging operations. The distributor could get by with less-frequent deliveries to his retailers. The corner store would not be faced with weekend spoilage and resultant inventory loss. And the consumer's chances of getting freah products would be enhanced. In the case of fish, boats could remain at sea longer. In all areas, delays in shipment or handling would become less serious.

the processor (who cuts and packs the meat); the distributor; the retailer; and the consumer.

Give all the increased holding time to one link, and the others have little incentive to become enthusiastic about the process. Apportion the time among them, and the risk of abuse mounts substantially. If each stage of distribution gobbles up "just a day or two more" than normal, the consumer's chances of getting a fresher product drops considerably. Conceivably, enough abuse could wreck the whole venture.

The question of time rationing is just one phase of the predicament. The others:

- FDA approval. To date, only Cyanamid has obtained federal approval—and that only for poultry. Fish and meat antibiotic treatment is yet to be approved. (Authorization of fish treatment could come this year.)
- Industry standards. Sanitary standards for flesh processing are vitally important because they markedly affect the efficacy of antibiotic treatment. Currently, compulsory federal standards and inspection exist only for red meat plants engaged in interstate commerce. Voluntary inspection is in effect for poultry; no compulsory federal standards are now applicable to fin fish. (Mandatory federal inspection of poultry plants may soon be made law.)
- Pricing. Although treatment of poultry costs only about 1/3-1/2¢/lb., Pfizer reports that some processors resist this expense. Less antibiotic could be used, but this would reduce the amount of extra shelf-life time, increase abuse danger. (Cyanamid, however, has set specifications for the minimum amount to use.)
- Education. Here, there's first the problem of training processors to use





PFIZER'S LANGLOIS, CYANAMID'S BOWMAN: They'll have to be right.

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the treatment correctly. Then figure the difficulty in getting retailers and consumers clearly aware of the fact that treatment only delays spoilage, does not permanently stop it. A delicate teaching chore, this must be done without raising the stigma of "chemicals in food." Actually, cooking destroys antibiotic residues in poultry. But this fact may be difficult to fix in consumers' minds as well as in the minds of sensationalist writers. Still another complication: consumer education on antibiotic treatment also plays up the fact that there are bacteria in fish and meat. This might tend to scare people away from purchase.

 Misuse. Sloppy application, even in just a few instances, could defame the whole process, bring down the wrath of federal agencies.

The answer to these marketing problems is by no means worked out. Still, Cyanamid and Pfizer are making progress:

Cyanamid has trademarked its poultry process (Acronize), is now embarking on a franchising program. Stiff standards have been set; processors must at least meet the standards of voluntary federal inspection, let Cyanamid people train operators, keep processing records, and submit to inspection by company representatives.

Concurrently, Cyanamid is engaged in a big test-marketing program in the South. Goal: to determine whether poultry can be merchandised under a branded process. Market research and motivation research studies on what influences consumer poultry purchases are also under way. The outcome, says Burton Bowman, general sales manager for Cyanamid's Fine Chemicals Division, will help shape Cyanamid's future market plans.

All for Consumer: Ideally, Bowman would like to see the processor and the retailer take as little of the time bonus as possible, pass most of it on to the consumer. This would guarantee that chlorotetracycline-processed fowl would be of superior quality, hence spur demand.

"For the long haul," adds Cyanamid's Wilbur Miller, industrial applications director of the Fine Chemicals Division, the retailer must consistently get his share of the time. Said Miller, "He's the one who can make or break the whole idea."

Pfizer's market strategy is not yet



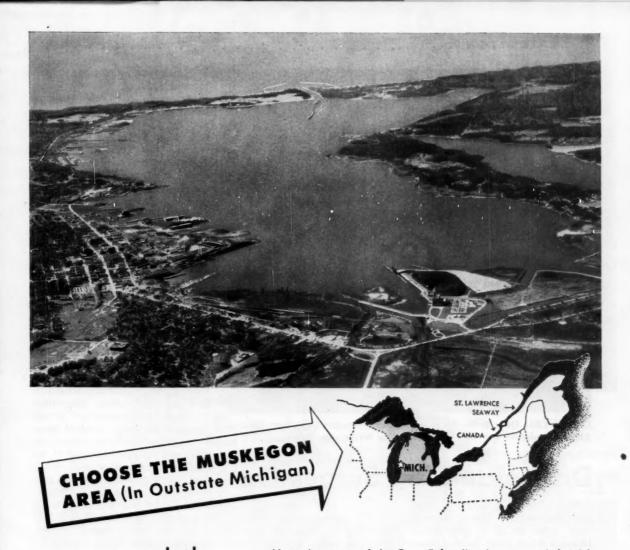
PRECISION NEEDED: In Acronizing poultry, treatment must be exact.

firmly crystallized (one reason: Pfizer has not, to date, received FDA approval).

Thinking at Pfizer, explains Jack Langlois, manager of the Food and Beverage Dept. of the Chemical Sales Division, is leaning away from franchise-type distribution and promotion of a nationally advertised trademark. Langlois sees great difficulty in policing the distribution of the benefits, telling processors to clean up plants, forcing shipment within specified times after processing, etc.

Nevertheless, he says, the processor may well become the link that Pfizer pins its market development hopes on. Pfizer's tentative concept: the processor himself should take some benefit from the process, offer most of the remaining increased storage time strictly as an upgrading feature of the product. Pfizer would not promote the process extensively (if at all) to the consumer; the treatment would serve as a sales tool, merely as added insurance of fresh delivery to outlying parts of the distribution system.

If these sensitive, formidable distribution problems can be resolved (and both companies are noticeably optimistic), chemical development will have successfully met one of its most intriguing and difficult marketing challenges.



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DESIGNERS: Ohio Bell's Burgoon (left) and Brackenridge, and Diamond Alkali's Anderson test their contribution to information processing.

# **Data Handling Surges On**

New advances in integrated data processing continue to mark the forward surge of office automation. Diamond Alkali, latest chemical company\* to install IDP, has just unveiled its version, revealed several significant refinements.

Diamond's setup is the first to use American Telephone & Telegraph's Model 28 teletype machine with "stunt box" and an electromechanical "flipflop" device to produce an IDP system with completely integrated information. This means that data once manually typed (key-boarded) is never subsequently retyped manually. Although current IDP systems greatly reduce manual retyping, they do not completely eliminate it.

Also new is Diamond's use of code numbers for designating freight classifications on bills of lading and shipment notices. Sanctioned by the carriers the firm employs, the code enables simultaneous preparation of both forms with each containing only that information of value to the recipient

\*Other users include Olin Mathieson (CW, Aug. 28, '54, p. 56), Dow, Du Pont and Allied Chemical (CW, Sept. 3, '55, p. 44).

of the form (bill of lading goes to carrier, shipment notice to customer). In addition, equipment at Diamond will print the codes on the tapes, allow for direct feed of tapes to a computer, thus avoiding need to first convert to punch cards.

By combining its IDP with wire transmission, Diamond will parlay the common advantages of the technique and the special benefits from its own version to a method that completely eliminates mailing of forms and data between locations.

Nub of the Cleveland company's hookup, the Model 28 teletype machine is basically similar to other models, but the stunt box provides 15 additional functional codes besides the usual five that govern ordinary typing operations. These extra codes permit selective operations to be performed. Thus, by striking the proper letter or letters, an operator can omit certain portions of a tape, call in chosen stations, send to all stations simultaneously, etc.

The flip-flop device allows data from different tapes to be selectively integrated onto another tape by simply touching a control.

The setup at Diamond may be loosely described as a combination of centralized and decentralized IDP. Here is how it functions:

Branch offices are furnished with a master symbol tape carrying three codes: stop control, typing control, and flip-flop entry. This tape, in combination with information that stays constant about a customer's order practices, is used to produce a third tape, the "customer master" is used to prepare sales orders. Variable data are keyboarded in at the same time to produce a salesorder tape. (Four printed copies of the order are made for office and customer records.)

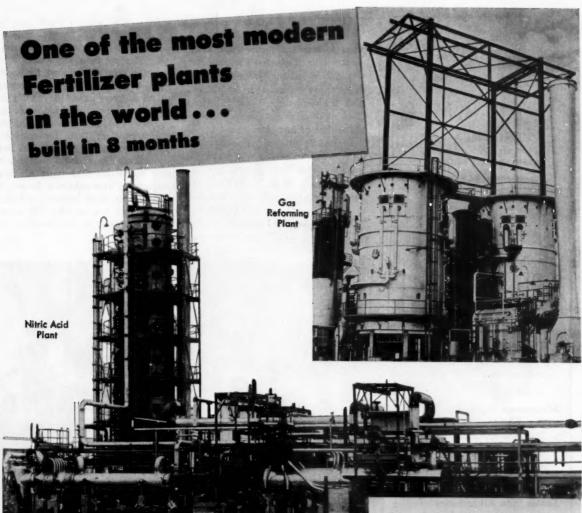
The sales-order tape is next transmitted to Diamond's central office at Cleveland. Here, three copies (credit, traffic, central order department) of the sales order are printed along with a tape copy. The central order section then adds new variable information (including calculations of freight charges, taxes, etc.), received from the traffic and credit departments, to the sales-order tape by means of the flip-flop and appropriate codes on the Model 28, and at the same time produces three new tapes.

An "authority-to-ship" tape is wired to a plant; a tape for billing is held at the office; and a special tape for multiple shipment orders is made.

Two copies of the "authority-toship" tape are printed at the central office, five at the plant location plus a copy of the tape. Upon preparation of the shipment at the plant, their "authority" tape is punched with code symbols for freight classification, prices, and tradenames, then used to print the bill of lading, notice of shipment, and a special "short shipment" ("SS") tape.

This "SS" tape, complete with boxcar numbers, weights, shipping date, etc., is transmitted to the central office where an exact replica is reproduced to serve as an advice-on-shipment tape. By means of the flip-flop and codes of the Model 28, the central office combines the billing tape and its copy of the advice-on-shipment tape to make a final tape and an invoice.

The final tape is now free for sales analysis purposes in computers or punch-card calculators. Currently, Diamond will use calculators, but



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#### DISTRIBUTION

plans to install a medium-size computer within 12 months. The computer will invoice and store information for an entire day's operation in 30 minutes. And, the computer will provide rapid checking of price and freight rate data at the time of invoicing.

Diamond's installation, says systems man Brett Anderson, will serve 28 locations with three private circuits; rental cost is about \$100,000/year. This expense excludes \$25,000 spent in designing the system, \$5,000 for installation fees, and the costs borne by Ohio Bell, AT&T, and other com-

panies in providing technical services.

But if these costs are steep, more so is the return. Diamond figures it will save \$18,000/year on its present operations, plus about \$17,000/year gain on the use of capital funds, which, of course, exclude the many intangible benefits of IDP. Take, for example, improved scheduling of sales visits and production. These could well result from now-impractical types of data comparison, now-unknown forms of data analysis. Such benefits, real and potential, are reasons why IDP keeps making headway in the chemical industry.



FORWARDERS-SHIPPERS: Someone's rocking the boat.

# Scrutiny of the Bounty

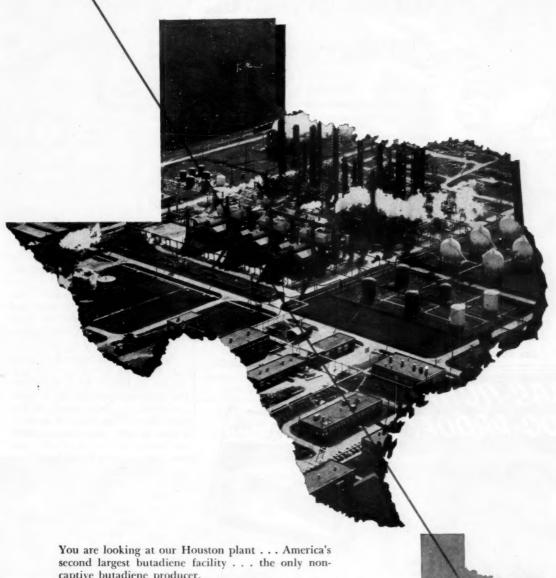
Some big chemical and oil companies are having to scrutinize their export procedures these days. Reason: the hearings now going on in Washington to ferret out questionable practices between shippers and freight forwarders. Headed by Rep. T. A. Thompson (D., La.), a Merchant Marine and Fisheries subcommittee has been probing the subject for six months, is now on the verge of issuing a report recommending new legislation.

About 1,500 freight forwarders are registered with the Federal Maritime Board. They act in dual capacity as forwarding agents for shippers, freight brokers for steamship lines. From shippers, they usually receive a flat fee. From the ship lines, they usually get a brokerage fee of 11/4% of the gross freight charges.

This can, and does, vary, however. Some forwarders charge shippers nothing—content themselves with the brokerage fees. The brokerage fees also vary. Nonconference lines, such as Isbrandtsen, pay 2½%; others pay up to 5%.

Racket? Charges have been made that many big exporters—blue-chip companies included—routinely do the work ordinarily handled by forwarders. Yet these companies desig-

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nate freight forwarders, allow them to collect brokerage fees for nonexistent services. Also charged: many exporters employ dummy forwarders, i.e., act as their own forwarders and collect the brokerage fee. The latter practice isn't easy to detect because forwarders have only to register with the Federal Maritime Board, are not subject to close control.

When questioned about employing forwarders who render only token service, Colgate-Palmolive, Esso Standard Oil and Ford Motor admitted doing it. But they pointed out that this was a long-time "practice of the trade."

In exchange for designating forwarders, the companies paid normal freight charges, but put forwarders under obligation to them in case of future need for their services.

Ocean carriers (which pay the brokerage fee) haven't raised too much fuss about the practice. They don't want to jeopardize possible business stemming from forwarders. And they include brokerage on their books as operating cost, pass it on to the taxpayer, who subsidizes the line.

Purpose of the Congressional study is to determine if the Bland Forwarding Act of 1942 makes it mandatory that government agencies use forwarders (some do; others, namely the Defense Dept., refuse to); and to see if private industry practices are within the limits of the law. Applicable laws are administered by the Federal Maritime Board. Rather loose practice obtains in the registration of forwarders by FMB.

In an attempt to surround itself with an aura of efficiency, and to mitigate charges that it isn't on top of things, FMB recently came up with proposed changes in maritime law.

One possible upshot of the probe: legislation to eliminate all payment of such brokerage fees. Another is some sort of screening procedure to weed out questionable operators. Still another possibility is to require an itemized accounting of services performed by forwarders. Most likely: no licensing arrangement enacted, closer scrutiny of forwarders demanded, payment of brokerage fees allowed.

Whatever the outcome, it's going to mean a readjustment of exporting procedures. It would not be amiss for some companies to batten the hatches for rough seas ahead.



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Remarkable Properties—These M&C products are neutral-colored, uniform, ultra-fine, grit-free, inert powders. They coat the troublemaking chemical with a highly-sorptive barrier that won't shake off. They are low in cost, light in weight and highly sorptive . . . a little bit goes a long way.

A partial list of applications where the presence of a small quantity of insoluble inert presents no problem (in most cases less than 1% is needed for good conditioning).

Ammonium nitrate crystals

Ammonium sulfate Napalm

Fungicides Soil conditioners

Dry fire fighting chemicals

Ammonium nitrate prills

Metallic and other soaps Insecticides

Resins and plastics Granular high

analysis fertilizers Sulfur

Mc Profiles



Selective mining by M&C helps to assure chemical processors the best in anti-caking agents and in other products for given end uses. This typical M&C mine gives an idea of large extent of workings... more reasons to

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- Important miners and processors of non-metallic minerals
- · Leaders in related research and development
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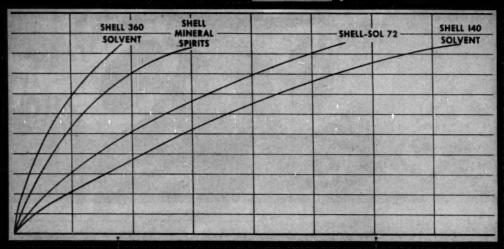
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The chemicals I am interested in conditioning are:

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for low odor and odorless products



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...a slow drying, high boiling, high flash point solvent with a very mild odor.

#### SHELL 360 SOLVENT

... evaporates rapidly. Since aromatics have been removed, has very low odor.

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...conventional distillation range, solvent power and drying. Mild odor.

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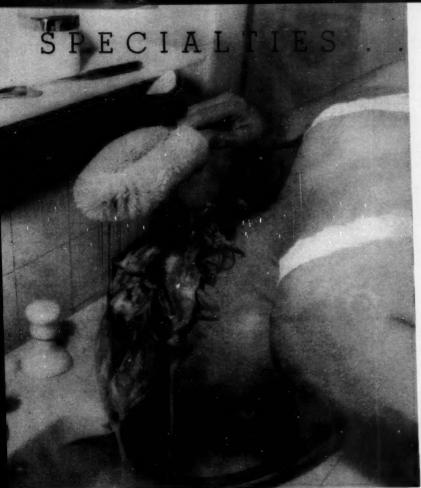
Detailed specifications of these Shell Solvents are contained in this booklet which will be mailed on request.



# SHELL OIL COMPANY

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SHAMPOOS: Cleanliness and a touch of luxury-worth \$100 million/year.

# New Ideas in the Suds

Raft of ideas—special stingless formulations, compositions designed for men, new packaging—may hoist the sales of shampoos well over the \$120-million/year mark.

Besides new sales, new ideas can bring in new raw materials—top supplies now are alcohol sulfates, alkylolamides, monoglycerides, soap. Amphoteric surfactants can boom, too.

But status of top brands proves that no idea will hit the top unless it has solid advertising, merchandising behind it.

MORE THAN ONE shampoo manufacturer got a surprise from his copy of the newly available '55 sales census of soap and glycerine producers. It revealed that liquid soap shampoos set an all-time record in gallonage output—some seven manufacturers reported production of 437,000 gal.

Valued at \$1.8 million (at the manufacturers' level), the soaps represented a 7.3% share of the total soapers'

shampoo output (about \$25 million at the manufacturers' level\*)—a sizable jump over the 4.8% and 5.7% portion they claimed in '54 and '53, respectively.

It's such a striking rise that several shampoo makers are pausing to con-

\*Because many shampoo makers are cosmetic firms, not soapmakers, this figure is regarded in the trade as about half the actual value of shampoo products. However, because the same representative firms report to this census year after year, trend indications are valid, and in soap shampoos in particular, the record high output seems indisputable.

sider whether this minor resurgence means that syndet-based products will make no further inroads into the shampoo market—they're wondering if this is still another trend they're going to have to watch.

Their concern, however, is not generally shared. More prevalent is the feeling that the soap-shampoo recovery won't ever be much greater, in spite of campaigns such as J. B. Williams' current push for its soap-type Conti Castile. Much more important, the trade feels, are several new ideas regarding synthetic detergent-base products.

For Men Only: Several of these ideas are largely promotional. The Mennen Co.'s (Morristown, N.J.) campaign for its Men's Shampoo (an all-synthetic detergent product) is particularly noteworthy—shampoos have long been bought almost entirely by women; the male market is virtually untapped. And the industry is well aware that Mennen has made a smashing success of its men's deodorant, which, says Mennen, has been the topselling spray deodorant since last summer.

Success of aerosol shampoos, other potential comers, depends on several factors, both promotional and technical in nature. As in the case of shaving creams, cost shouldn't weigh too heavily. Last year's total shampoo output, estimated at \$50-60-million worth (about \$25 million worth produced by soapers; the remainder by cosmetics firms), retailed for about \$115-120 million. This 2-to-1 ratio of retail value to manufacturer's value for shampoos is much greater than that for toilet soaps, roughly 1.3 to 1.

It is felt that shampoos are bought for their connotation of luxury, as well as for purposes of cleanliness—the foam texture, odor, and similar qualities appear to count as much to the consumer as does the cleaning quality.

But syndet shampoo formulations, o.k. in unpressurized metal cans, seem to be corrosive in combination with propellents. And though soap-base shampoos haven't this handicap, nearly all of these are now modified with synthetics—so the same problem obtains. But better can linings, perhaps

glass containers, will likely whip this puzzler.

No Sting, No Pain: Another well-watched idea with definite promotional potential is the use of certain surface-active agents to produce "stingless" or non-eye-irritating shampoos. Johnson & Johnson (New Brunswick, N.J.), with its baby shampoos, is the most active in this field, and sales of its formulation are known to be booming. Already, several stingless items are being readied for the market.

Should the non-eye-irritating shampoos catch on fully, they could easily alter the detergent raw material market. Now, salts (sodium, ammonium, amine) of lauryl alcohol sulfates are most widely used—perhaps 5.9 million lbs. (100% active ingredient) consumed yearly. Monoglycerides (Colgate now makes and uses the total output of about 1.3 million lbs.) and fatty acid amides (about 0.7 million lbs.) are also in common use, as are soaps.

Right now, all the stingless products are based on raw materials from Miranol Chemical Corp. (Irvington, N.J.). Miranol has six substances of this type, some of which are described as the reaction products of fatty alcohol sulfates with its amphoteric surface-active agents; others the firm doesn't characterize.

Originally designed as low-foames, stingless types now sold foam as well as competitive products. Miranol says that, although all its products pass Draize animal sensitivity tests, it can't guarantee that some people won't be allurgic to its surfactants.

Though not the only firm using Miranol's ingredients, J&J has a long head start with its brand of children's shampoo. The field is wide open, though, on application of the "stingless" tag to "adult" shampoos, however.

Three-Fourths of a Market: Currently, the job of supplying the lauryl sulfates is split among several firms. Procter & Gamble, Andrew Jergens, Helene Curtis and Raymond Laboratories produce their own material (about ¼ of the total). The remainder is supplied by a handful of firms, which produce the cosmetic grades required: American Alcolac (Baltimore) and Du Pont are the biggest producer, while Stepan (Chicago) and Onyx Oil (Jersey City, N.J.), Krystall Chemical Co. (Chicago) and Edwal Laboratories (Chicago) also provide a

sizable portion to the market.

Alkylolamides, easy to produce, are most frequently made by shampooproducers themselves; supplying those who don't make their own are Ninol Laboratories (Chicago), Stepan, Oynx, Ultra Chemical, Mona Industries.

Matter of Form: All these products can be formulated into shampoos of the currently popular forms—liquids, lotions, jels or creams. The public is fairly evenly divided on these; all sell well. Soap association figures indicate, however, that emphasis on the jel or cream (solid) type is steadily increasing—poundage of the solid type is about twice that of the liquids, although the liquids still out-value them.

There are literally hundreds of brandnamed shampoos, but one authority estimates that 15-18 brands have 99% of the liquid market; 15

or so cream types take about 98% of their market. Besides these, at least 175 others vie for the remaining small portion of the market.

Surprisingly, only Colgate and P&G of soap's "Big Three" are in this fight. Colgate has two entries—top-selling Halo liquid, and likewise top-selling Lustre Creme\*. P&G has three entries, Drene (liquid), Shasta (cream) and Prell (jel), all of which are in the top three or four of their fields. Lever, possessor of the now "dormant" Rayve Creme, admits to exploring possibilities, but has made no overt moves yet.

Rugged Independent: Second-selling liquid (a detergent) is put out by John Breck (Springfield, Mass.) Toni's White Rain and Pamper, Jergen's Woodbury, Charles Antell's Formula

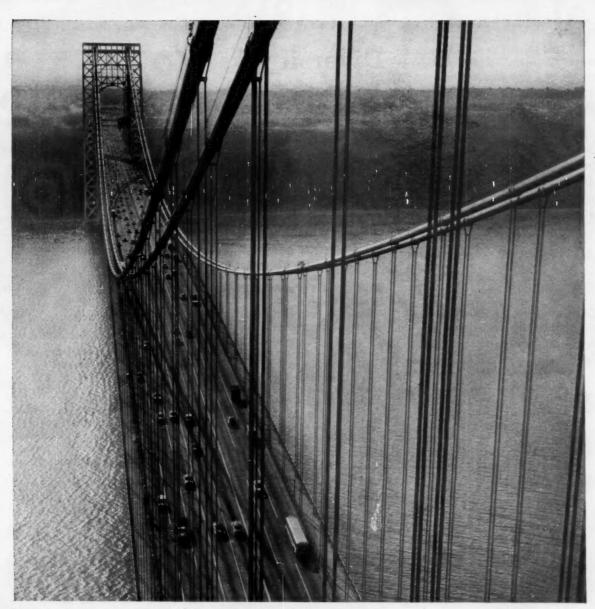
\*These market positions based on the 1955 Consolidated Newspaper Consumer Analysis.



# **Cultivating a New Market**

AS HE SPRAYS his row crops this year, this Florida farmer will be compensating for still one more deficiency of his soil: molybdenum. In his tank is a 20-20-20 fertilizer containing the element as a soluble molybdate. The fertilizer—Davison Chemical Co.'s (division of W. R.

Grace & Co.) Nurish—is the first molybdenum-containing plant food to gain nationwide distribution; 35 molybdenum-deficient areas in the U.S. already have been found. Fertilizer is expected to eventually become a 1-million-lbs./year molybdenum outlet.



GEORGE WASHINGTON BRIDGE, most traveled suspension bridge in the world, was opened to traffic in 1931 and now serves over 30 million vehicles annually.

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RESEARCH AND EXPERIENCE DEVELOPED THE FINE CHARACTER OF ESSO SOLVENTS

9, and Grove Laboratories' Fitch are major sellers, as are products of Richard Hudnut, Lanolin Plus Mfg. Co., Avon, and Helene Curtis.

Among the cream types, Toni, Avon, I. R. Watkins (Winona, Minn.) and Helene Curtis have products with substantial sales, as do Nassour Bros. (Los Angeles), Studio Girl; La Maur, Modart; Duon, Inc. (Coral Gables, Fla.), Vita Fluff; Hudnut, Velvetouch.

By emphasizing such special ingredients as lanolin, egg and bacteriostats, some of the products have carved a fairly secure sales position. But as is the case with many cosmetic-class products, advertising seems to affect sales more than do special components.

Combine the big ad budget with something new—such as the "male" sales pitch, the aerosol package, or the stingless ingredients—and there's no telling how far new shampoos will go in '56.

## Field Mixup

Fertilizer and insecticide makers, harassed by the multiple registrations and regulations applicable to these combinations of their products, may have a way out: let the farmer mix them himself. Two new emulsifiers developed by Emulsol Chemical Corp. (Chicago) now make it possible.

The farmer benefits, as well as the manufacturer, by getting greater flexibility. For some time, the laborsaving advantages of a single, combination product that both enriches the land and controls soil pests have been apparent. But, the specific chemical needs vary so much from farm to farm that maximum effectiveness requires a wide range of combinations—almost custom-tailoring.

The new emulsifiers, developed by Emulsol (an associate of Witco Chemical Co., New York), make this custom-tailoring possible right in the field. The products—Emcol H-A and Emcol H-B—permit a wide range of insecticides\* to be mixed with all types of liquid nitrogen-phosphorus-potassium fertilizers, the company says.

A further advantage to makers is the possibility of using emulsifiable insecticide concentrates containing Emcol H-A or H-B for conventional aqueous spray applications. This should help eliminate carry-over-stock problems.

\* Aldrin, benzene hexachloride, chlordane, dieldrin, endrin, heptachlor and nemagon.

# Diversifying Within One Field

Renovation and re-equipping completed, Guardian Chemical Corp (Long Island City, N.Y.) last week started production in its new \$100,000 plant. The new 7,200-sq.-ft. facility more than doubles Guardian's work space, and it testifies to the success of the firm's key product, Clorpactin° (CW, Jan. 31, '53, p. 55), a versatile composition that has provided the firm an entree to diverse fields.

Pleased as it is with its new facilities, Guardian is more pleased with its recent sales growth-in the past 10 months, sales have climbed some 250%, according to the firm's president, Alfred Globus. Again, the firm lays its success to its versatile monoxvchlorosene. But it has also rounded out its line of disinfectants to include a host of other microorganism killers. By diversifying within the field of disinfectant chemicals-it has added such compounds as hypochlorous acid derivatives, hexylresorcinol, ophenylphenol, cresylics, phenolics, solubilized iodine, quaternaries, and mercurial-, copper-, and silver-agents for disinfection, purification, etc.-it now claims to have the world's most complete line of chemicals for these pur-

Dollars vs. Poundage: Guardian's current sales pace is about \$250,000 annually. A public-owned corporation since 1952, Guardian now finds that while pharmaceutically aimed Clorpactin, the first product, is still No. 1 in dollar volume, its industrially directed Dynactol (also monoxychlorosene) has become the major poundage item.

Dynactol, for industrial applications (such as dye stripping, swimming pool disinfection, etc.), has recently become a factor in the dry-bleach field. Rad Products (New York) is giving

\*Clorpactin is, in Guardian's terms, one of the brandnames for its monoxychlorosene—a generic term Guardian also created. No exact description of monoxychlorosene is available, but it is an Ocl-containing "composition" Guardian makes by its hush-hush process involving hypochlorous acid and organic compounds. Clorpactin and Dynactol are both monoxychlorosene—in a very broad sense. Clorpactin is the pharmaceutical grade, Dynactol the technical grade.



WIDE WORLS

GLOBUS: An all-encompassing campaign against microorganisms.

its Dynactol-containing Red Crystal Bleach a test-marketing in New England. Like many chlorine bleaches, it has about 5-6% available chlorine. Somewhat similar formulations are finding industrial and military applications as senitizing agents.

But Guardian has lately been emphasizing the medical applications of Clorpactin. Assembling considerable data on in vivo testing, the firm now says its product has shown a broad range of activity by destroying microorganisms causing such illnesses as tuberculosis cystitis, interstitial cystitis. It can be used without damage to living tissue—killing the bacteria and virus, and removing dead tissue. Clorpactin WCS-90 is the grade for these purposes (it can apparently be safely injected into the bloodstream, though it seems to lose activity there).

One of the brightest new products in Guardian's line is its Surtenol, a viscous yellow liquid described as the non-OCL-containing equivalent of Clorpactin, in action. So far, main uses have been as a disinfectant and preservative in products like paints.

In spite of the strides in production, application and sales, Guardian feels it has yet to exploit the full versatility of its products, and counts on its new facilities to permit their full potential to be realized.

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perforations
are helping us
fill our
Multiwalls
faster

A CHEMICAL COMPANY packing a highly aerated hygroscopic material ran into a snag: filling speeds were slow because trapped air could not escape through the Multiwall's asphalt-laminated ply.

A Union packaging specialist came up with the answer—special perforations. The tiny vents allowed the air to escape without affecting the strength of the bags, the moisture vapor protection of the barrier ply, or allowing material to 'blow out.

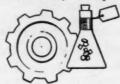
This simple change greatly increased the packer's filling speed and, in doing so, reduced his packaging costs.

Talk with Union about your Multiwall bagging operation. Perhaps Union Multiwalls and Union Multiwall Packaging Machinery can make your packaging dollar stretch still further.



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## No Sting, No Stain

Seven years ago, Johnson & Johnson (New Brunswick, N. J.) began to look for a means of getting in on the \$21-million/year household antiseptic market that its gauze products were helping to cover.

This week J&J will begin introducing the result of its search: First Aid Cream, a medication for the treatment of cuts, burns, abrasions, chapping, sunburn and insect bites. TV (Robin Hood) viewers and magazine (women's) readers will be told and retold that the cream will fight infection, relieve pain, aid healing, without sting or pain when applied to open wounds.

Included in the message are safety and convenience factors: the cream is nontoxic, greaseless, won't stain skin.

The product that must live up to this billing contains bithionol (Monsanto's Actamer), benzyl alcohol (the anesthetic) and eucalyptol—all blended into a water-miscible cream base claimed to keep the antiseptic in contact with the wound.

After trying both metal and polyethylene tubes and two different prices in test markets, J&J decided on a 1½-oz. polyethylene (Bracon) tube at 98¢. A ¾-oz. tube will be included in a coming first-aid pack (with gauze, Band-Aids) at 69¢.

Also gained in the test markets: some healthy optimism. The cream took 23.9% of the market within 2½ months of introduction.

# **Edging Away**

A simple extra crimp has given water-base paint containers an additional six to nine months of corrosion-free life. Enamel coating of the entire interior of the can has kept the paint and can separated—now Continental Can has eliminated what has long been the system's Achilles' heel: the uncoatable edge of metal on the inside of the lid seat.

On conventional cans, corrosion starting at this point can spread rapidly throughout the whole can. Polyvinyl acetate and latex-base paints, which have a tendency to turn from alkaline to acid during storage, have, through this entrance, been eating away their containers, suffering a shorter shelf-life than the less corrosive oil-base paints.

Continental has come up with an extra twist, which leaves the exposed edge on the outside of the can, presents no uncoated surface for the paint to act upon. The new "outward curl" cans are now in production at the company's Chicago plant, are available in quart and gallon sizes.

Cold Weather Stability: Paul Johnson, Cullen Metzger and John Musch of Firestone Tire and Rubber have tried several novel chemical approaches to the problem of making water-base paints stable to freezing and thawing. According to U.S. Patents 2,731,433,-4,-5, p-toluenesulfonamide, p-phenylene dibenzenesulfonamide, hydrazine hydrate and substituted hydrazines, and guanidine thiocyanate all appear to reduce the degree of breakdown of paints that are frozen and thawed.

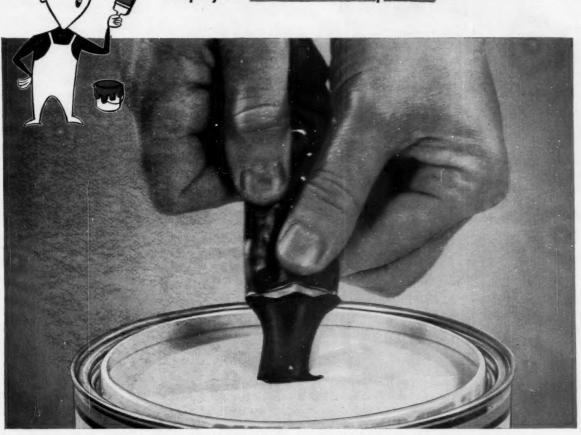
Dry Fibers: A methyl polysiloxanic resin is a waterproofing agent for organic fibrous materials in U.S. Pat. 2,735,791. The resin, along with a triethanolamine titanate, makes up about 0.5-6% of the fabric weight.

# V Drier Dry Cells

Don't be surprised to see a new kind of competition—based on different types of products—in the flashlight battery business next fall. The starting gun: General Electric's announcement this summer of plans for the "truly dry" battery it has just developed.

The new cell uses as an electrolyte a plastic ion-exchange membrane, instead of the aqueous solution now found in "dry" cells. (The solution, incidentally, was a leakage problem until the development of modern "leakproof" cases.) GE's all-dry battery is claimed to be rechargeable, simpler and smaller than present cells. Low internal resistance will mean more current, according to the company. Envisioned uses are in flashlights, hearing aids, many types of transistor circuits.

Not yet known: whether GE will make and market the cell, buck old-hand giants Eveready (UCC's National Carbon Co.) and Ray-O-Vac. Another reason why EVERFLEX G helps you sell more PVAc paints!

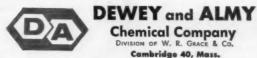


# Announcing a new EVERFLEX G formula for PVAc UNIVERSAL TINT BASE—compatible with all major tube tinting systems!

Now you can get a real sales advantage over your competition. Using EVERFLEX G in a new, tested formulation available from Dewey and Almy, you can be among the first paint manufacturers to offer PVAc universal tint base!

The colors in all of the major oil and alkyd tube tinting systems disperse in this base quickly and thoroughly to form a uniformly tinted product. You add this new advantage without sacrificing any of the outstanding film properties that EVERFLEX G gives to all PVAc paints.

Retailers will welcome this new PVAc universal tint base. It means that they no longer need to stock a variety of shades of PVAc paints or special colors for tinting PVAc paints. Start your sales on the upward trend *right now* by getting in touch with the nearest of the Dewey and Almy sales offices listed below. They'll be prompt to supply samples of PVAc tint base made with EVERFLEX G. Phone, wire or write today!



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# **Technology**

Newsletter

CHEMICAL WEEK March 24, 1956 You may soon see another booster for Ferrocene, the organometallic that attracted attention originally as a fuel additive (CW, Jan. 21, '55, p. 54) and has lately been causing a stir as a polymerization catalyst (CW Technology Newsletter, Feb. 18): Standard Oil of California has just been granted a British patent on a process for making it.

Essentially, the method consists of heating iron carbonyl and cyclopentadiene at 400-900 F to form iron bis-cyclopentadienyl (ferrocene). The compound is made by Du Pont. Hercules, like Standard, has obtained patents on it.

Move coal cross-country by means of pipeline? Not quite, but George Love, president of Pittsburgh Consolidation Coal, in the firm's annual report last week hinted in broad terms that it would be possible.

The company is already working on a pipeline to move coal slurry 110 miles from Cadiz, O., to Cleveland (CW, May 1, '54, p. 30). This line will deliver 1.2 million tons/year to the Cleveland Electric Illuminating Co., is due in by the beginning of next year. "This new concept," Love says now, ". . . may be applicable to the transmission of large tonnages over any conceivable distance." And he made it clear that his company is prepared to go ahead with such plans if the railroads don't take steps to reduce what he feels are excessive freight charges.

Tennessee Eastman's decision to commercialize Verel, its acrylic fiber, caps off a rash of activity in that field. Late last year, Goodrich decided that it would put its Darlan dinitrile fiber on the market. Dow has said that it will have an acrylic out before the end of the year, and Cyanamid is still weighing the future for its Creslan acrylic. (If you are inclined to bet that Cyanamid will go ahead with the project, you should give slight odds.)

Eastman is not saying much about the new material. But for years it's had an M-series of fibers out for evaluation. (Verel is also known as M-30). Not much is known about the composition, but—like Cyanamid's—it's believed to be a terpolymer (one of the three monomers is, of course, acrylonitrile). The flurry in acrylics means . . .

You can expect to see new producers and new processes for acrylonitrile. Cyanamid is raising its sights, doubling the capacity of its Fortier (La.) plant. Acrylonitrile would be a logical step for Dow, a bridge to span the processing gap between acetylene (plans for which were recently revealed) and fiber. It would also fit in with Dow's known interests in acrylamide. And Eastman has done a lot of research on acrylonitrile processes (e.g., U.S. Pat. 2,733,259). In addition to firms with fiber interests, National Research is pilot-planting its own process to make acrylonitrile.

These precocious isocyanates are behind National Aniline's plans for an addition to the research and engineering center it dedicated only last May at Buffalo, N.Y. The Allied Chemical Division said last week that it would use the new space for application research on diisocyanates. National Aniline is now investigating diisocyanates in flexible and rigid polyurethane foams as well as in rubber, textiles, adhesives, protective coatings, and paper and leather treatment.

# **Technology**

# Newsletter

(Continued)

The expansion will take the form of a one-story, 10,000-sq.-ft. building, to be located behind the research center. Fifty chemists and technicians are being sought to staff the new facilities, which should be completed late this year. A new disocyanate plant is now being built by the company in Moundsville, W.Va.

Add this to your fast-growing file of polyethylene developments. Sequoia Process Co. (Redwood City, Calif.) will shortly begin beating the drum for an irradiated polyethylene that is claimed to withstand indefinite exposure at 150 C (vs. 120 C for General Electric's irradiated polyethylene).

That spells wire coating to the electrical industry, although pipe manufacture is another likely outlet. Wire coaters will be offered a process whereby polyethylene is blended with certain dry ingredients, pelletized for homogenization, extruded on the wire and irradiated.

There's said to be no hot or cold flow after treatment—which means pipe threads that work—and the material never melts; at elevated temperatures, it carbonizes. Tensile strength and related properties are reported to be about three times those of normal polyethylene, while cost is estimated at slightly less than half that of Teflon (which the product approximates from the standpoint of physical properties).

Flammability, on the other hand, is no better than that of ordinary polyethylene, although Sequoia is confident it can lick this problem in the modification step.

The new plastic will go by the tradename Hyrad—a designation that will also apply to irradiated linear polyethylene: treating Ziegler polyethylene requires a slight modification of the formulation step. But the result, declares Sequoia, is a better product than that yielded by ordinary polyethylene.

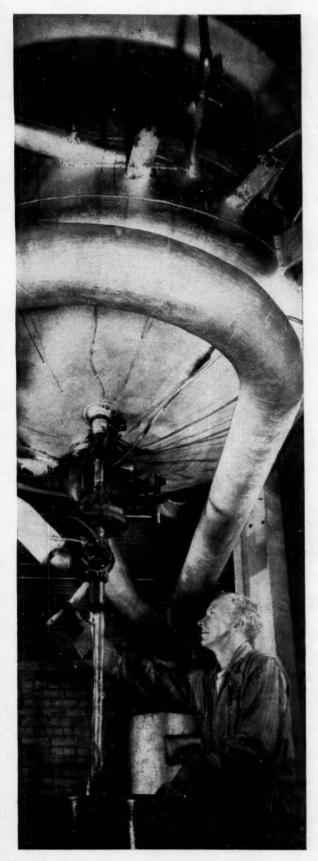
It's perfectly conceivable that eventually only linear polyethylenes will be used. But until they become more freely available, the company will not offer these materials commercially.

If you balk at the term "electronic brain," consider this item of equipment unveiled at the opening session of this week's convention of the Institute of Radio Engineers (New York). It's an electronic scanning and computing device, called a cytoanalyzer, that scans the microscope images of cells, sorts out those that are cancerous. In minutes, the instrument can do work requiring months for a technician to accomplish by ordinary methods. The device was developed at Airborne Instruments Laboratory under the sponsorship of the American Cancer Society and the U. S. Public Health Service.

Howe Sound's Garfield, Utah, cobalt plant, which uses the Chemetals process, is finally operating at its estimated capacity of 8,000 lb./day. Chemical Construction, the process's developer, operated the plant until last month, in accordance with its agreement with Howe Sound.

Now, the latter is setting up research facilities at Garfield to promote commercial uses of the critical metal.





# busy BISPHENOL A top resin intermediate

Versatile Dow product widens markets for paint formulators

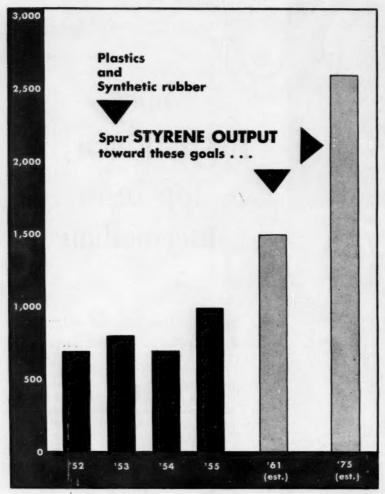
Fast-moving epoxy resins have sky-rocketed in production since World War II, and Bisphenol A is a basic building block in their manufacture. The future looks even brighter with coatings based on these resins moving into many untapped fields.

Dow pioneered the development of substituted phenols and is the major supplier and best source of high-quality Bisphenol A. The company also supplies two other important resin intermediates—p-tert-Butylphenol and p-Phenylphenol.

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# Styrene's First Billion

What's ahead for styrene? In one word—expansion. Production of styrene monomer will be pushed hard during the next half-decade, should increase by at least 50% to about 1.5 billion lbs./year.

But unlike the situations prevailing in certain other chemical industries, there's not much fear of styrene overcapacity, because the monomer's main outlets, too, are expanding rapidly. For one, synthetic rubber production is booming; and it now appears that polystyrene—the other big outlet—will hold its own against strong competition from polyethylene.

On the other hand, neither is there a threat of styrene shortage, even

though output in '55 was close to a capacity-crowding billion pounds; the reason: new plant capacity will assure sufficient supplies for several years ahead. Right now, for example, these styrene expansions either have recently been completed or are in progress:

- Foster-Grant is doubling its capacity, will be able to produce 50 million lbs./year at Baton Rouge, La.
- U.S. Rubber, also at Baton Rouge, is constructing a \$1.4-million unit.
- Bakelite is spending about \$2.7 million on a new plant at Marietta, O.
- Cosden Petroleum is putting up a 20-million-lbs./year installation (costing \$3 million) at Big Spring, Tex.

Meanwhile, other indications of a forthcoming busy styrene scene include plant constructions in styrene-consuming industries. Dewey and Almy, for example, is putting finishing touches on a 4-million lbs./year styrene-butadiene copolymer unit at Acton, Mass.; American Cyanamid is building a 40-million-lbs./year methyl styrene plant at Fortier, La.

And these expansions are really just a continuation—albeit at a somewhat accelerated pace—of previous rapid developments in the industry.

In 1950, styrene production (all grades) was about 539 million lbs.; since then, production has risen steadily (except for a slight temporary slump in '54), and to date the over-all gain amounts to some 460 million lbs./year.

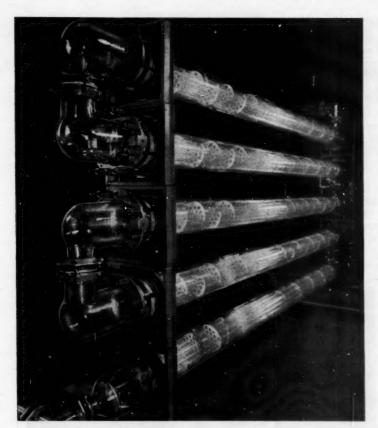
Consequently, the estimated 1.5-billion output for '61—approximately half-billion more than today—may be conservative, especially in view of the ballooning synthetic rubber and plastics businesses. Beyond this period, forecasting becomes more hazardous, of course; nonetheless, some industry observers now confidently predict continuing steady growth for styrene during the following 15 years—to a 1975 production figure of about 2.6 billion lbs.

End-Use Shift: Of the approximately 1 billion lbs. of styrene consumed last year, fully 50% went into polystyrene, 40% into GR-S rubber, probably not over 5% into styrene-butadiene copolymers, and 5% into miscellaneous uses.

This breakdown indicates a significant change from the previous year's end-use pattern; both polystyrene and GR-S consumed 4-5% more of total styrene last year than in '54, while butadiene copolymers and miscellaneous applications each used about 5% less.

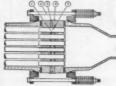
These shifts in the end-uses of styrene only emphasize the relatively greater production-boosting impact of the leading outlets, plastics and rubber. However, it does not mean that styrene-butadiene copolymer needs have dropped off (they actually increased some 15%), but only that the percentage share of total styrene consumed by this outlet is smaller now than a year ago.

Final figures on 1955 styrene resin



Now you can get off-the-shelf delivery on corrosion-proof shell and tube heat exchangers. This new type of unit, low in initial cost, costs nearly nothing to maintain.

# Header assembly ends floating head, packing gland troubles



The unique "fluid" seal between the shell side and the tube side is effected by a Silastic sealer sheet (1). This acts as a fluid and is put under fluid pressure

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# Mono Oleates Di

of
Diglycol
Ethylene Glycol
Diethylene Glycol
Polyethylene Glycol
Propylene Glycol
Polyoxyethylene
Butoxyethyl
Glycerine



# MARKETS .

production are not yet available, but conservative estimates place the total resin output at over 550 million lbs.; it may actually have been closer to 600 million.

But assuming that consumption of resin was on the order of 535 million lbs. last year, some 375 million probably went into molding materials, 90 million into protective coatings, and 70 million into miscellaneous uses (e.g., resins used for metal treating, ion exchange, rubber reinforcing.)

A breakdown of the molding resin uses puts refrigerator needs at the

top, with requirements of some 83 million lbs. Other molding material outlets run about as follows: wall tile, 53 million lbs.; packaging, 56 million; housewares, 41 million; toys, 38 million; radio, TV, phonograph records, together, 34 million; miscellaneous uses, 70 million.

Meanwhile, GR-S rubber production in '55 climbed to over 791,000 tons, and will undoubtedly continue to increase rapidly in the next few years. By the end of '56, for example, GR-S capacity in the U.S. will top a million long tons/year; by '57 it should go



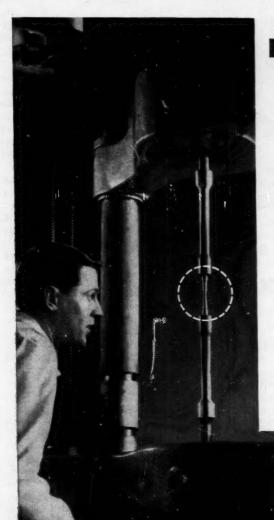
# Meter Market for Butyrate

ELECTRIC METER COVERS made of butyrate plastic are helping utility companies cut costs of replacements in places where breakage is frequent and weathering is a problem.

The plastic housings are transparent—easy to read through—weigh only 11 oz., provide high

impact strength and resistance to glazing.

This new outlet—potentially a large one—added to other growing butyrate markets (e.g., in the manufacture of toys, automotive parts, pipe) should help boost total cellulosic plastic production well beyond last year's 123 million lbs.



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The Wm. Powell Company

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FIG. 2475—Stainless Steel O.S.&Y. Globe Valve For 150 Pounds W.P.



FIG. 1559—150-Pound Steel Lubricated Plug Valve. Sizes

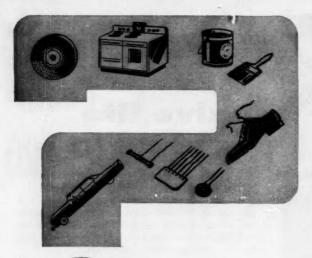


FIG. 3003—Steel Gate Valve For 300 Pounds W.S.P.



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# MARKETS . . . . .

as high as 1.3 million tons (CW, Jan. 28, p. 82).

This means, of course, that the rubber industry's future styrene needs will be much higher than the approximately 395 million lbs. it required in '55. However, the full potential of styrene's rubber market will be curtailed slightly by the growing use of oil extenders in GR-S.

Protective coating uses of styrene still trail, volumewise, but nonetheless constitute a large and growing market; and it's a market that obviously will continue to expand along with the national housing boom.

Of the 90 million lbs. of styrene that goes into coating materials, close to 90% is used in styrene-butadiene copolymers; and the major portion of these copolymers ends up in paints (the rest is used for paper coating and styrenated alkyds).

It's pretty clear, then, why styrene makers are optimistic. With the future of the industry tied not to one but to several healthy markets, expansion is all but inevitable.

# **Detergent Tally**

"Clean America gets cleaner," says the Assn. of American Soap & Glycerine Producers, and offers as proof its just-completed '55 detergent sales census. Here's how the consensus of 80 manufacturers supports this view:

Sales of soaps and synthetic detergents in '55 totaled 3.67 billion lbs., 4.6% higher than in '54. Corresponding dollar sales went up to \$861 million from \$793.4 million.

As expected, sales of synthetic detergents (solid and liquid) reached a new high, now represent 63.2% of the market. Volumewise, synthetics were up 12%, from 2.06 billion lbs. to a near 2.32 billion; dollar sales increased 13.8%, from \$475.4 million to \$540.9 million.

The popularity rating of liquid detergents is on the ascendant, as indicated by a 28.8% increase of sales over 1954; 153 million lbs. were sold in '55. 118.8 million lbs. in '54.

As for soap, it's still on the downgrade in poundage though not in dollar value. Sales volume of soap dropped to 1.350 billion lbs. last year, from 1.443 billion in 1954—off another 6.4%. However, dollar values of these shipments totaled \$320 million, up a wee 0.7% over 1954.

# X Check list for LITHIUM Researchers—No. 2

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cific application relative to Lithium not indicated in the checklist, note the fact in the form furnished, attach it to your letterhead and send it to us. Our re-search laboratory will look into the matter for you.

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Porcelain enamels Pottery glazes Special glasses Pharmaceutical chemicals Lithium salts	☐ Storage batteries ☐ Gas absorption ☐ Pharmaceutical chemicals ☐ Multi-purpose greases ☐ Lubricating oils	Gas absorption Air conditioning Welding rods Brazing fluxes Lithium metal
Heat treating salts	□ Lithium salfs	☐ Heat treating salts ☐ Deicer fluid
LITHIUM COBALTITE	LITHIUM BROMIDE	LITHIUM NITRATE
Uses:	Uses:	Uses:
Porcelain enamels (ground coats and colored cover coats)	☐ Air Conditioning ☐ Pharmaceuticals ☐ Gas absorption	☐ Refrigeration ☐ Heat treating salts
LITHIUM MANGANITE	LITHIUM SILICATE	LITHIUM TITANATE
Uses:	Uses:	Uses:
Porcelain enamels (ground coats for kitchenware, refrigerators, stoves, etc., cover coats for colored ware) Semi-conductors	☐ Titanium porcelain enamels☐ Glazes for sanitary ware☐ Pottery glazes	☐ Titanium porcelain enamels ☐ Ceramic glazes ☐ Electric porcelains
LITHIUM ZIRCONATE	LITHIUM ZIRCONIUM SILICATE	LITHIUM ALUMINATE
Uses:	Uses:	Uses:
Porcelain enamel ground coats Titanium porcelain enamel cover coats Ceramic glazes Electric porcelains	☐ Ceramic glazes ☐ Electric porcelains	☐ Flux in highly refractory enamels
LITHIUM (META)BORATE	LITHIUM MOLYBDATE	
Uses:	Uses:	
As a flux in enamel cover coats	As smelter or mill addition in white enamel cover	
I am interested in Lithium	(Compound, Metal or Derivative)	for
the following application:	(Composing, Moral of Softmany)	
•		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Technical Data Sheets are available checklist. They will be sent	e for every compound in the tas checked above.	LITHIUM CORPORATION
trends ahead in indu	strial applications for Lithium	OF AMERICA, INC.

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# Market

Newsletter

CHEMICAL WEEK March 24, 1956 Acetylene chemicals have been a long time coming, but from now on you will hear a great deal more about them. Reason: last month, General Aniline and Film began full commercial-scale production of the materials (CW, March 17, p. 90); now, Antara Chemicals (GAF's sales division)—out looking for customers—is dangling greatly reduced price tags as inducements.

Polyvinylpyrrolidone (PVP), for example, has been price-slashed by some 37%, is now at \$1.25/lb. in tank-car lots. Main uses: cosmetics, pharmaceuticals, textiles, lithography, photography, detergents.

A big 30% price cut on butanediol brings the cost to 28¢/lb. in tankcars. The chemical is especially useful as a basic raw material in the manufacture of plasticizers and plastics.

Other acetylene-derived chemicals now bear the following tabs in tank-car lots: butynediol (35% aqueous solution), 9¢/lb.; butyrolactone, 38¢/lb.; 2-pyrrolidone, 55¢/lb.; vinylpyrrolidone, 80¢/lb. And in carload quantities: propargyl alcohol, 73¢/lb.; pharmaceutical-grade PVP, \$3.20/lb.

Higher polyethylene prices are being posted by one producer. Effective April 1, Du Pont polyethylene will carry these new tags: on truckload quantities: wire coating resin, Alathon 5L, 38¢/lb., up 3¢; pipe resin, Alathon 25, 38¢ lb., up 2½¢; Alathon 10 polyethylene resin and Alathon 20, 41¢/lb.

Announced simultaneously with the above price changes are two new Du Pont polyethylene resins. Alathon 34 is designed for film applications, features increased clarity, stiffness, high permeability; Alathon 37, a general-purpose molding material, is characterized by fast cycle, high gloss and stiffness. Both will sell for 43\$/lb. in truckloads.

And beginning this week, more polyethylene will move into the marketplace as Koppers' new plant at Port Arthur, Tex., starts full-scale commercial production. When operating at peak capacity, the plant will turn out 18 million lbs./year of pelletized material.

A temporary cutback of foam rubber production is imminent at the Hewitt-Robins plant (Buffalo, N.Y.), major supplier of foam rubber cushioning for passenger cars. Reason: declining orders from auto manufacturers. Already on a four-day week, the plant will now operate on a two-shift basis rather than three. It's expected, however, that foam output will be back in full swing when auto sales pick up in the spring.

Hewitt-Robins will also probably make plastic foam at the Buffalo foam products plant. The firm's interest in plastic foam is not surprising, though; most leading U.S. rubber companies have a finger in the business (witness Elastomer Chemical's long list of licensees for vinyl foam production).

Cellophane production, too, is due for a cutback. A drop in sales volume necessitates curtailment of Cel-O-Seal output—beginning May 1—at Du Pont's film plant in Buffalo, N.Y.

Built-in booby traps for plant-devouring insects are capturing the attention of cotton growers, giving pesticide makers something to think about. Called Thimet, a new insecticide produced commercially by American Cyanamid is applied to cotton seeds to produce plants that kill early season insects; the systemic insecticide gets into the growing plant, is carried in the sap stream in sufficient quantities to kill feeding insects.

# Market

# Newsletter

(Continued)

Advantages claimed: its use could replace two to four early season spray or dust applications, and eliminate uncertainties as to the proper time to spray; plants other than cotton (e.g., many food crops, fruit trees, tobacco) could also benefit if tests now under way are successful.

But there are happier undertones for fertilizer makers in a report from the University of Washington. Extensive studies have indicated that double the normal rate of growth is obtained if Douglas firs are fed nitrogen fertilizers; for example, fertilized 33-year-old trees add 65% more timber volume each year than unfertilized trees.

The discovery is of special interest to Christmas tree growers because, in addition to growth acceleration, appearance of the tree is improved—yellowish-green trees become dark green, needles are longer.

Looking for pyrethrum extract? Sale of 75,000 lbs. from the nation's stockpile of strategic materials will begin Sept. 17, reports the General Services Administration. In order not to disrupt regular markets, disposal will be spread over a 12-month period; sale will be through normal channels of trade and at the going market price (now about \$10/lb.).

Development of substitute synthetic materials (notably allethrin) for insecticide compounding is behind the government's move to reduce pyrethrum stocks.

Antimony oxide prices are down again. Increased by  $2\phi/lb$ , some months ago to compensate for rising antimony costs (CW Market Newsletter, Oct. 22, '55), the oxide's tabs now revert to the original amounts:  $27\phi/lb$ , in truck loads,  $28\frac{1}{2}\phi/lb$ , l.c.l.

Growing contender for the world's plastics markets—that's the United Kingdom as shown by its latest export figures. Shipments abroad in 1955 totaled nearly 85,000 tons, with a value of \$64.4 million. In 1954, exports were only 74,000 tons, worth \$57.4 million. West Germany, too, is forging ahead on international plastic sales (CW Market Newsletter, March 17).

Ethanol production is on the rise. U.S. Treasury Dept. figures put undenatured domestic output from July 1, '55, to Jan. 31, 56, at 277.6 million proof gallons. This contrasts with production of 229.4 million proof gallons during the comparable period a year ago. Total stocks at the end of January at industrial alcohol bonded warehouses and in denaturing plants: 42 million proof gallons.

# SELECTED CHEMICAL MARKET PRICE CHANGES-Week Ending March 19, 1956

UP		
Gum, turpentine, Sav. gal. Ethyl acetate, cans	Change \$0.005 0.05	New Price \$0.5575 0.35
DOWN		
Antimony oxide, truck load and car load	0.02	0.27
Carnauba wax, No. 1 yellow	0.02	1.06
Cottonseed oil, crude, Valley	0.0012	0.1475
Coconut oil, crude	0.0012	0.1212

All prices per pound unless quantity is stated.

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HOUDRY'S OBLAD: It's creativity that counts, individually or on a team.

# Captain Takes Another Look at the Team

Caught between rising operating costs and the paucity of scientific manpower, research directors are taking another look at a time-honored concept—that research by a team of specialists is the surest way to get results.

On the one hand, team research is drawing fire from those who consider it an excessive damper on creative initiative at a time when creative individuals are most needed. The other side contends that the individual must wholly immerse himself in the group, which is more likely to produce results, more often. (See box, p. 58.\*)

Somewhere between these poles is Houdry Process Corp.'s Alex Oblad, a 46-year-old catalysis expert, whose convictions in this area of research management are standing the test of time and a rough marketplace. Vicepresident,† and manager of the company's research and development division, Oblad is one of the mainstays of a medium-size company in direct competition with some mighty big research and development organizations in the petroleum and chemical industries.

That his company is thriving, perhaps speaks best for the effectiveness of its research. Oblad's formula? It's "getting people of outstanding abilities, taking care to see that their individuality is not crushed by the team."

There's nothing wrong with the team idea, he averred this week, in an exclusive CW interview. The danger is

†And member of the company's board of directors.

too much emphasis on conformity of team members. "Nothing will kill productivity in research quicker than insistence on conformity in thinking." The team, he believes, "should contain individualists." And that's the cue for leadership. "A good leader," he declares, "can make highly individualistic people work as a team."

The trend toward team research is on the upswing, Oblad observes, "and will continue to grow because much of today's research is empirical by nature.

"As we accumulate more and more fundamental information—thermodynamic, kinetic, etc.—we progress further toward team handling of problems," he maintains. "Ultimately, a research team may be made up of people skilled in using data, abetted by computing machines. But we're not

<sup>\*</sup>Gleaned from the recently published proceedings of New York University's ninth annual conference on the administration of research. New York University Press; \$4/copy.



'Ultimately, a research team may be made up of people skilled in using data...'

there yet, so we still need individual intuition and initiative."

In this connection, Oblad believes that potential researchers need to be taught how to think. "There is a tendency," he finds, "of developing a robot type of thinking in universities. The people we are getting today from universities are well trained in their science. But too few possess a high degree of originality.

"What we need," he declares, "are people who can work on a team, but maintain their individuality—with each individual contributing as many new ideas and fresh approaches as he can. We cannot solve a problem in half the time merely by putting twice as many people on it; it's the quality of ideas that counts."

He warns that an intrinsic hazard of the team approach is to become stylized in the choice of solutions of problems. "Don't let your teams be composed of the same individuals for too long a time," he cautions. "Reconstitute teams from time to time, depending on the particular problem they are working on. This is especially important if a solution is a long time coming."

Oblad has found no easy way to spot idea-men. Aptitude and personality tests, in his opinion, aren't reliable gauges of creativity. "We have used psychological tests to evaluate our staff," he reports, "feel psychologists learn as much from us as we do

from them. In screening applicants for research positions, we still rely on personal evaluation."

Oblad, like most of his counterparts in other companies, has found no substitute for creative individuals. Help them retain their individuality, he counsels, if you want creative teams.



"... But we're not there yet, so we still need individual intuition and initiative."

# What Other Research Managers Are Saying

C. C. Furnas, University of Buffalo (Buffalo, N.Y.):

"It is very important that we remove the concept that one-man research is absolutely necessary. Teara research can be perfectly honorable for a Ph.D. We sometimes still cling to the theory [of a] . . . lone genius in the tower."

Thomas Vaughn, Colgate-Palmolive Co. (Jersey City, N.J.):

"There is a growing conception that regimentation and almost thought control are being used in industrial research today. Nothing is further from the truth."

E. Duer Reeves, Esso Research and Engineering Co. (New York, N.Y.):

"I think there is a lot of misunderstanding about what industry means by team research; I get the impression that a lot of people look at it as if we mean a platoon of soldiers... What we try to do is get a group of people together, each with different types of skills. We try to be sure that they are completely trained in the skills in which they should excel... We explain to each one the area that he is supposed to attend to, and from then on they are on their own."

Robert Cairns, Hercules Powder Co. (Wilmington, Del.):

"[Researchers] have to learn how to add to the efforts of the team. But the point is that their efforts are individual. Progress is individual progress in each step."

R. E. Gibson, Applied Physics Laboratory, The Johns Hopkins University:

"... There is certainly not a greater percentage of the population now than there was 150 years ago that can really do constructive work in an atmosphere of meditation ... However, we still have ... to have room for those who want to meditate, and their influence will spread out ... as it has in the past."

Thomas Killian, Office of Naval Research (Washington, D. C.):

". . . [Employers] seem more concerned about the ability [of prospective employees] to work on teams, their willingness to cooperate, than about individual scientific competence. They almost seem to put a premium on their ability to conform . . . We have seen a lot of this in government and I hate to see it. I think that it will weaken industry if they continue to feel this way."

# New Dye: Brightest Blue Yet?

A new Du Pont-developed blue dye for cotton and rayon fabrics is getting a close look by textile men this week. Called Lusane Blue B, it's reportedly brighter in color, yet equal in fastness to the best competitive dyes. Significance: it's the latest effort of a copper phthalocyanine manufacturer to develop a dye with the superior color and fastness properties of copper phthalocyanine pigments.

More expensive on a per-pound basis than vat and direct dyes—\$8/lb. vs. \$1.50-5/lb.—the new dye is claimed to have four times the tinctorial strength of these materials.

An unusual method of application is, in large measure, making all of these claims possible. Unlike other phthalocyanine dyes for cotton and rayon, Lusane Blue is fixed within, rather than on the surface of, the fiber.

A Clue: While Du Pont declines to reveal the product's exact chemical identity, a clue is given in U.S. Pat. 2,414,374 (issued to Imperial Chemical Industries). Several compounds therein-one of which is 1,3-diiminoisoindoline-are postulated as intermediates in the formation of phthalocyanines. By reacting these intermediates with a copper salt (e.g., cupric chloride), a compound is formed, which, upon application of heat and a reducing agent (e. g., sodium bisulfite), is converted into copper phthalocyanine. This intermediate copper compound is believed to be similar to Du Pont's Lusane Blue.

Pros and Cons: Besides brilliance

and fastness, the new dye features an ability to be shaded with vat dyes. This allegedly permits a variety of brilliant blue hues (e. g., turquoise shades). In addition, it's said to have excellent rub stability to resin treatments that impart crush-, crease- and water-resistance.

This would augur a market in cotton and rayon materials such as dress goods, draperies and shirts. The dye is not recommended for dyeing package goods (e. g., sewing thread) and toweling; here the color tends to migrate during the drying operation and uneven dyeing results.

Du Pont admits that color unevenness is a problem, is still seeking ways to overcome this difficulty. And because the dye is not one of the easiest to apply (it requires carefully controlled processing conditions), production costs are higher than for vat or direct dyeing: it won't compete directly with these dyes.

Follow the Leader: Another drawback is that solvents are required in the process. Some dye men feel that solvents constitute a potential explosion hazard, are reluctant to use them, Du Pont laboratory tests, however, indicate that relatively little danger is involved when its recommended formulation is used.

Because of these limitations, only the larger, more completely staffed and equipped textile firms (e. g., Burlington Mills, Crompton) have looked at the dye. If the shade catches with them, Du Pont feels the smaller commission dyeing houses will also switch to the product.

Pad It On: The dye solution is applied to the fabric by padding. Either pad-dry-jig methods or the Du Pont pad-steam continuous dyeing process reportedly can be used.

The padding solution is made by dissolving dye in monoethyl ether (for example, Carbitol), then dispersing in water. Small amounts of triethanolamine, aminoethylethanolamine, dispersing agents, and thickening agents complete the formulation.

After the solution is padded on, the material is heated to 250-325 F. This is the critical step, in which the dye is fixed in the fiber, must be carefully controlled to prevent color migration. In a final step, the fabric is padded with sodium bisulfite, effecting final dye fixation.

The idea behind this process is that



# Improving Aerosol Analysis

LATEST DESIGN in cascade impactors — used for measuring aerosol particle size distribution— is this model developed at Battelle Memorial Institute. Features: large samples can be analyzed in short time, microscopic particle counting

is eliminated, evaporation and nonrepresentative sampling are minimized. Shown with its designer, J. Mason Pilcher, the device was made for the Army Chemical Corps. It's intended for air pollution, insecticide, etc., studies.



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# Sodium Dispersions Spark Many Reactions Once Thought Impractical

Sodium dispersions—a Du Pont development which quickly caught on to become a familiar tool in many parts of the industry—are used in a number of important reactions, many of which were impractical before the technique was discovered. Here is a brief-rundown of some of the prin-



cipal types in case you have a similar problem and haven't tried sodium dispersions as a possible solution yet:

REDUCTION . . . Esters to alcohols . . . mitriles to amines . . . fatty esters to keto alcohols and acyloins . . . and aromatic hydrocarbons such as naphthalene to 1,4 dihydronaphthalene.

REFINING HYDROCARBONS . . . Inert hydrocarbons such as naphthalene can be refined with less than 1% by

weight sodium. Use of sodium dispersions reduces cycle to minutes with little or no agitation.

CLAISEN CONDENSATION . . Sodium dispersions produce striking results in Claisen condensations such as the preparation of aceto acetic ester by self-condensation of ethyl acetate.

PREPARING ALCOHOL-FREE ALKOXIDES . . . Sodium alkoxide solutions or slurries can be readily prepared by treating sodium with an excess of alcohol.

HALIDE CONDENSATION . . . Sodium can be used in the condensation of alkyl or aryl halide, such as in the preparation of decane from amyl chloride.

POLYMERIZATION CATALYST . . . Sodium is useful as an active catalyst in many polymerization reactions, including the preparation of butadiene-type synthetic rubbers.

To help you take advantage of the versatility of sodium dispersions in your own laboratory or manufacturing process, Du Pont has prepared an informative booklet telling you how to make and use them. For your copy, simply fill in the coupon.

# Formaldehyde — The Chemical Button

Formaldehyde is one of the most reactive organic chemicals. It reacts with a wide variety of organic and inorganic compounds to make many interesting and useful derivatives. It takes part in many reduction, addition, condensation, and polymerization reactions. Its methylene (-CH<sub>2</sub>-) group functions as a "chemical button" to link similar or dissimilar molecules.

High purity 50% and 37% formaldehyde is available at low cost from Du Pont. For more information about its properties, just check the coupon.

# Epoxide Applications Grow with Refinements in H<sub>2</sub>O<sub>2</sub> Technique

The highly reactive nature of the epoxide ring, together with recent developments in the *in situ* epoxidation of natural fats and oils, have combined to give hydrogen peroxide a promising role in the production of a growing list of new intermediates and industrial chemicals from these plentiful raw materials.

For example, among the possible uses for epoxides, or for epoxides further modified with other chemicals, can be cited: plasticizers for polyvinyl chloride, stabilizers for chlorinated rubber, synthetic drying oil compositions, resins and resin coatings (resulting from cross-linking or curing via epoxy groups), synthetic lubricants and lubricating oil additives, detergents and other surface active compounds, synthetic waxes, emulsifiers and modifying agents,

# Tough Greaseproof Protection for Paper from "Elvanol" Polyvinyl Alcohol

Tough, flexible films that find many uses on paper products can be produced from solutions of "Elvanol" polyvinyl alcohol. "Slush-coating" of fiber drums, for example, produces

a rugged, greaseproof coating ideal for the packaging of oily or greasy materials.

Completely hydrolyzed grades of "Elvanol" form excellent greaseproof coatings for packaging nuts, doughnuts, cookies, etc. Durable coatings are easily applied, provide a protective barrier against air—so important in food wrapping—and take customary folds,

creases and hard wear without cracking.

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and the manufacture of certain insecticidal compounds.

Epoxides have also shown promise in pharmaceuticals, steroids, as solvents, fireproofing impregnants, sulfite esters, rubber-like materials, cytotoxic agents, and in compounds for preventing fermentation and mold formation.

# THF—A Versatile Intermediate



Tetrahydrofuran—probably best known as a powerful solvent for polyvinyl chlorides and other hardto-dissolve plastic materials—also has many promising possibilities as a chemical intermediate.

Tetrahydrofuran undergoes a wide variety of reactions, generally with ring fission. Some typical reactions are: oxidation to succinic acid; chlorination to yield 2, 3-dichlorotetrahydrofuran; hydrochlorination to yield 4- chlorobutanol; and acylation to yield esters of 1, 4-butanediol.

Of further interest to the chemist is the fact that THF is useful in extraction and as a solvent medium, particularly for Grignard, sodium acetylide and other reduction reactions. Its ether structure, stability, and low boiling point, together with its high solvent power make THF of real value in both fields.

Prompt shipments of Tetrahydrofuran are now available in tank car and drum quantities from Niagara Falls, New York.

Send the coupon at left for more information about THF.

# RESEARCH. . .

when heated, the water evaporates, causing fiber to swell. Solvent and dye can then penetrate the fiber where heat converts the dye into copper phthalocyanine.

Competition: Right now, the newcomer's closest competitor probably is Alcian Blue 8GN 150, made by Arnold, Hoffman & Co. (Providence, R.I.), an ICI subsidiary. The Alcian dye, also a phthalocyanine derivative, possesses many of Lusane Blue's properties (both desirable and undesirable). But it can't be mixed with vat dye to yield other shades; nor is it quite as brilliant.

Arnold Hoffman says that it's now evaluating 3-4 other phthalocyanine shades, expects to add them to its line.

Another similar product is Phthalogen Brilliant Blue IF3G, a German import handled by Verona Chemical Co. (Union, N.J.). The dye is made by Badische.

Among other dye makers, reaction to these products is mixed. Two companies, Allied Chemical & Dye and Nova Chemical Co. (New York), report they're researching similar dyes. Other firms, including Geigy, Ciba, Carbic-Moss, General Aniline & Film and American Cyanamid, are watchfully waiting.

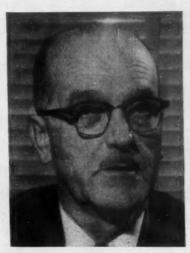
Even Du Pont won't go out on a limb to predict the future of the new-comer. It is aware that processing problems are involved—that it will take time for Lusane Blue to gain acceptance, and it also knows that any dyes fortunes are subject to the vagaries of fashion. But, should fashion dictate a trend toward fast, brilliant blue shades, Du Pont feels its dye will certainly come in for a good share of the market.

Nuclear Note: Nineteen companies have signed to participate in the nuclear reactor research program at Armour Research Foundation (Chicago). Among the companies included are: Dewey and Almy, Eli Lilly, Kimberly-Clark, M. W. Kellogg, Victor Chemical. The foundation's reactor is expected to go critical in April.

Safety Record: An all-time safety record in the petroleum industry has reportedly been made by Standard Oil Co.'s (Indiana) Whiting research laboratories. The 1,200-man staff is nearing the 8-million-man-hours mark without a lost-time accident; previous

high was 7.5 million man-hours set by Esso in 1954.

Quick Ways: The National Bureau of Standards (Washington) reports it has developed speedy flame-photometric methods of determining the content of strontium and manganese in cements. Similar methods of determining titania, sodium and potassium are also said to have been worked out.



PARKS: No fears for a full house.

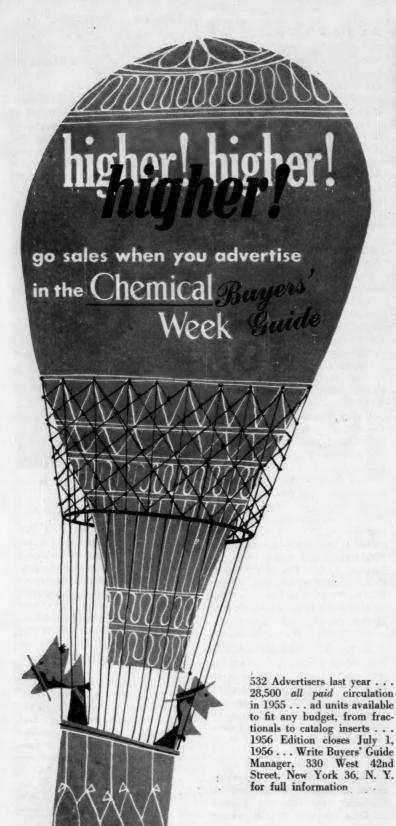
# Top Idea Swapper

This week is the last week you can submit an application to be at this year's Gordon Research Conferences\*—designed for relaxed idea-swapping by top-level scientists. But conference director, Rhode Island University's (Kingston) W. George Parks, isn't worried about a dearth of applicants. Limited to an attendance of 100 (for each subject covered), the conferences regularly attract a full quota of researchers.

Marking its 25th anniversary this year, the conferences can look back on a record as a sounding board for major research advances (e.g., first disclosures of syntheses of quinine, vitamin  $B_{12}$ ). But their primary purpose is to stimulate new research via free discussion, informal lectures.

This year, the conferences will be host to experts in polymers (e.g., Italy's

"Officially known as the Gordon Research Conferences of the American Asan. of the Advancement of Science, they'll be held June 11-Aug. 31 at New Hampshire's Colby Junior College (New London), New Hampston School (New Hampton), and Kimball Union Academy (Meriden). This year's complete program has been published in Science, March 2, '56, p. 357.



# RESEARCH. .

G. Natta), high-pressure research (England's K. E. Bett), and textiles (Germany's W. Weltzein). As in the past, conferences on these and other subjects will be attended only by those who can contribute to the discussion.

# EXPANSION. . .

Gleaned from this week's research expansion notes:

- Dow has commissioned its new \$1.1-million biochemistry research laboratory at Midland, Mich., will conduct both applied and basic research studies there.
- General American Transportation Corp.'s Plastics Division will build a research and development laboratory adjacent to its plant at East Chicago, Ind. Completion of construction is expected by July 1, 1956.
- At Lockport, N.Y., Upson Co. is planning to start construction this spring on a research laboratory for its line of cellulose structural boards.
- Food Machinery & Chemical Corp. plans to transfer its Westvaco Chlor-Alkali Division research to FMC's Chemicals Research Center, now under construction at Princeton, N.J.
- Hart Products Corp., manufacturer of textile, leather and industrial chemicals, has opened its new laboratory at Jersey City, N.J.

# LITERATURE. .

Radioisotope Catalog: A revised radioisotope catalog is available from Union Carbide Nuclear Co. (Oak Ridge, Tenn.). Information on 175 stable isotopes is included.

Coffee Report: The Coffee Brewing Institute (New York) has just released its first coffee research report, entitled, "The Effect of Water Impurities on the Flavor of Brewed Coffee."

Ethylene Imine Bibliography: Just published by Chemirad Corp. (Port Washington, N.Y.) is an annotated bibliography on ethylene imine chemistry. The 65-page booklet is cross-indexed according to subject, author and patents.

Fluorocarbon Brochure: Properties and applications of Kel-F Elastomer, fluorocarbon rubber, are described in a new brochure from M. W. Kellogg Co. (New York).



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Pillo Chemical Work 330 W. 42 St., New York 36, N.Y.

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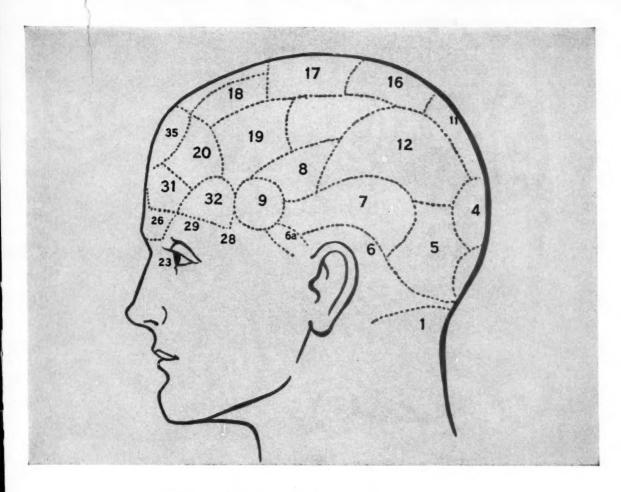
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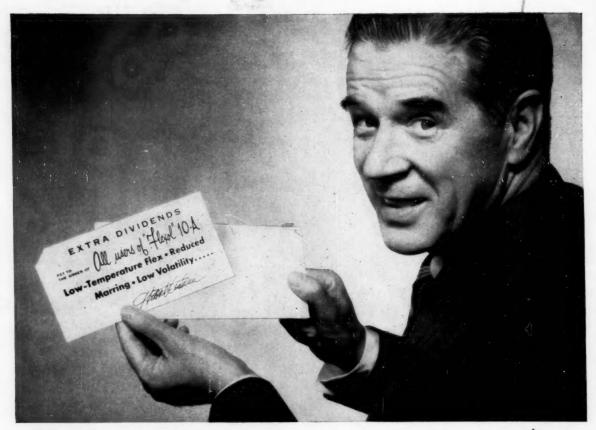
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